Eielson Air Force Base
Operable Unit 1

Declaration of the Record of Decision

Site Name and Location

Operable Unit 1
Eielson Air Force Base, Alaska

Statement of Basis and Purpose

This decision document presents the selected remedial actions and no action decisions for Operable Unit 1 (OU1) at Eielson Air Force Base, Alaska, chosen in accordance with the *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA), as amended by the *Superfund Amendments and Reauthorization Act* (SARA), the May 1991 *Federal Facility Agreement Under CERCLA Section 120* entered into by the U.S. Air Force, the U.S. Environmental Protection Agency, and the State of Alaska, and to the extent practicable, the National Contingency Plan. This decision is based on the administrative record file for this operable unit.

The State of Alaska concurs with the selected remedies and the no action decisions.

Assessment of the Sites in Operable Unit 1

OU1 consists of eight source areas that have been combined because of commonalty in contamination that is mainly caused by leaks and spills of fuels.

The OU1 source areas are

- ST20 E-7, E-8, and E-9 Complexes (Refueling Loop)
- ST48 Power Plant Area
- ST49 Alert Hanger
- SS50 Blair Lakes Vehicle Maintenance
- SS51 Blair Lakes Ditch
- SS52 Blair Lakes Diesel Spill
- SS53 Blair Lakes Fuel Spill
- DP54 Blair Lakes Drum Disposal Site

Three of the source areas (ST49, SS53, and DP54) will receive no further remedial action because they present little risk to human health and the environment. The no further action determination was made based on a remedial investigation/feasibility study and a basewide draft ecological assessment. Although

no further action is required, the groundwater at ST49 will continue to be monitored as part of the Sitewide Program to confirm the results of the remedial investigation. ST20 (E-7, E-8, and E-9), ST48, SS50, SS51, and SS52 will be remediated.

Actual or threatened releases and exposure of people to hazardous substances from ST20 (E-7, E-8, and E-9), ST48, SS50, SS51, and SS52 within OU1, if not addressed by implementing the response action selected in this record of decision, may present an imminent and substantial endangerment to public health, welfare, or the environment.

Description of the Selected Remedy

A feasibility study was conducted for ST20 (E-7, E-8, and E-9), ST48, ST49, SS50, SS51, and SS52. Sites within ST20 were separated into E-7, E-8, and E-9 based on their distance and source areas SS50, SS51, and SS53 were combined into one site (Blair Lakes) because of their proximity. Three remedial alternatives were considered in detail for each site. They are:

Alternative 1 No action
Alternative 2 In Situ Alternative
Alternative 3 Removal Alternative

Alternative 2 is the selected remedy for all of the source areas for which treatment is recommended (E-7, E-8, E-9, ST48, SS50, SS51 and SS52). It addresses the threats posed to human health and the environment by reducing the source of groundwater contamination at each source area. This remedy is intended to achieve groundwater cleanup through source removal.

The major components of the selected remedy include the following:

- Continue to operate the passive skimming system at SS51.
- Install passive skimming systems to remove fuel floating atop the groundwater if the product is sufficiently mobile to be recoverable.
- Install a bioventing/soil vapor extraction (SVE) system to remediate soil contamination that poses a threat to groundwater through leaching at ST20 (E-8 Complex), SS50, SS51, and SS52. This system may include air injection within the upper part of the groundwater table and the smear zone to volatilize and promote bioremediation of the contaminants. This entire system is also anticipated to reduce fuel floating atop the groundwater. The effect of a bioventing system on the permafrost at Blair Lakes will be evaluated prior to implementation.
- Expand the bioventing/SVE systems currently operating under the interim remedial action (OU1B) at ST20 (E-7 and E-9 Complexes) and ST48 to remediate soil contamination that poses a threat to groundwater through leaching. This system expansion may include air injection within the upper part of the groundwater table and the smear zone to volatilize and promote bioremediation of the contaminants. This entire system is also anticipated to reduce fuel floating atop the groundwater.

- Monitor groundwater at ST20 (E-7, E-8, and E-9 Complexes), ST48, SS50, SS51, and SS52, including increased monitoring (e.g., increased frequency, additional monitoring wells) near base water supply wells, to evaluate contaminant fate and transport until remediation levels are achieved.

- Notify the regulatory agencies of proposed dewatering activities, and evaluate their potential for impacting areas of groundwater contamination.

- Implement institutional controls to prevent exposure to contaminated groundwater. In the event of base closure, any remaining contaminated source areas will be addressed in accordance with CERCLA Section 120.

- Perform supplemental soil and groundwater sampling in the vicinity of well 50M05 (Blair Lakes) to confirm that no significant contamination remains.

Alternative 2 reduces risk substantially through treatment of the principal sources of groundwater contamination—fuels on top of the groundwater and soil contamination. Groundwater monitoring and institutional controls to restrict the use of groundwater will continue in the source areas. Institutional land use controls will be designed to prevent exposure to contaminated groundwater and will involve prohibiting the installation and use of any well for drinking water that could extract contaminated groundwater or affect the movement of contaminated groundwater. Site maps will be developed showing areas currently and potentially impacted by groundwater contaminants. This information can be referenced during base permitting procedures. To ensure long-term integrity of the above land use controls, the Air Force will ensure that, to the extent that groundwater contamination remains above unacceptable levels, deed restrictions or equivalent safeguards will be implemented in the event that property containing such contamination is transferred by the Air Force.

Statutory Determination

The selected remedies protect human health and the environment, comply with federal and state requirements that are legally applicable or relevant and appropriate to the remedial actions, and are cost effective. The remedies use permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable and satisfy the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element.

Because this remedy will result in hazardous substances remaining on-site above health-based levels, reviews will be conducted at ST20 (E-7, E-8, and E-9 Complexes), ST48, SS50, SS51, and SS52 within 5 years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

Eielson Air Force Base - Record of Decision
Signature and Support Agency Acceptance of the Remedy for OU1

THOMAS W. L. McCALL, Jr.
Deputy Assistant Secretary of the U.S. Air Force
(Environment, Safety, and Occupational Health)

9-27-94
Date

Eielson Air Force Base - Record of Decision
Signature and Support Agency Acceptance of the Remedy for OU1

William D. McGee

WILLIAM D. McGEE
Regional Administrator
Northern Regional Office
Alaska Department of Environmental Conservation

9/27/94
Date

Eielson Air Force Base - Record of Decision
Signature and Support Agency Acceptance of the Remedy for OU1

Signature

9-27-94
Date

CHUCK CLARKE
Regional Administrator
Region 10
U.S. Environmental Protection Agency

Contents

Declaration of the Record of Decision i

Signature and Support Agency Acceptance of the Remedy iv

1.0 Site Name, Location, and Description 1.1

2.0 Site History and Enforcement Activities 2.1

3.0 Highlights of Community Participation 3.1

4.0 Scope and Role of Operable Unit 4.1

5.0 Summary of Site Characteristics 5.1

5.1 Source Area ST20 Refueling Loop (E-7, E-8, and E-9 Complexes) 5.8

5.1.1 Soil Contamination at the E-7 Complex 5.10
5.1.2 Groundwater Contamination at the E-7 Complex 5.10
5.1.3 Floating Fuel at the E-7 Complex 5.10
5.1.4 Source Area Hydrology at the E-7 Complex 5.10
5.1.5 Soil Contamination at the E-8 Complex 5.12
5.1.6 Groundwater Contamination at the E-8 Complex 5.12
5.1.7 Floating Fuel at the E-8 Complex 5.12
5.1.8 Source Area Hydrology at the E-8 Complex 5.14
5.1.9 Soil Contamination at the E-9 Complex 5.14
5.1.10 Groundwater Contamination at the E-9 Complex 5.14
5.1.11 Floating Fuel at the E-9 Complex 5.14
5.1.12 Source Area Hydrology at the E-9 Complex 5.17

5.2 Source Area ST48 Power Plant Area 5.17

5.2.1 Soil Contamination at ST48 ..... 5.19
5.2.2 Groundwater Contamination at ST48 ..... 5.19
5.2.3 Floating Fuel at ST48 ..... 5.21
5.2.4 Source Area Hydrology at ST48 ..... 5.21

5.3 Source Area ST49 Alert Hanger 5.22

5.3.1 Soil Contamination at ST49 ..... 5.22
5.3.2 Groundwater Contamination at ST49 ..... 5.24
5.3.3 Floating Fuel Contamination at ST49 ..... 5.24
5.3.4 Source Area Hydrology at ST49 ..... 5.25

5.4 Blair Lakes Target Facility (Source Areas SS50, SS51, SS52, SS53, and DP54) 5.25

5.4.1 Soil Contamination for Blair Lakes Target Facility 5.26
5.4.2 Groundwater Contamination for Blair Lakes Target Facility 5.28
5.4.3 Floating Product at Blair Lakes Target Facility 5.28
5.4.4 Permafrost at Blair Lakes Target Facility 5.29
5.4.5 Source Area Hydrology at Blair Lakes Target Facility 5.29

6.0 Summary of Site Risks 6.1

6.1 Human Health Risks 6.1

6.1.1 Identification of Contaminants of Potential Concern 6.3
6.1.2 Exposure Assessment 6.4
6.1.3 Toxicity Assessment 6.30
6.1.4 Risk Characterization (Current and Future) 6.35
6.1.5 Uncertainty 6.44

6.2 Environmental Risks 6.45

7.0 Description of Alternatives 7.1

7.1 Remedial Action Objectives 7.1

7.1.1 Source Area ST20 (E-7, E-8, and E-9 Complexes) 7.2
7.1.2 Source Area ST48 ..... 7.2
7.1.3 Source Area ST49 ..... 7.3
7.1.4 Source Areas SS50, SS51, SS52, SS53, and DP54 ..... 7.3

7.2 Remedial Alternatives 7.4

7.2.1 Alternative 1: No Action Alternative 7.4
7.2.2 Alternative 2: In Situ Alternative 7.4
7.2.3 Alternative 3: Removal Alternative 7.6

8.0 Summary of the Comparative Analysis of Alternatives 8.1

8.1 Overall Protection of Human Health and the Environment 8.1

8.2 Compliance with Applicable or Relevant and Appropriate Requirements 8.2

8.3 Long-Term Effectiveness and Permanence 8.2

8.4 Reduction of Toxicity, Mobility, or Volume Through Treatment 8.2

8.5 Short-Term Effectiveness 8.3

8.6 Implementability 8.3

8.7 Cost 8.4

8.8 State Acceptance 8.5

8.9 Community Acceptance 8.5

9.0 Selected Remedy 9.1

9.1 No Further Action Sites 9.1

9.2 Recommended Treatment Action 9.1

10.0 Statutory Determinations 10.1

10.1 Protection of Human Health and the Environment 10.1

10.2 Attainment of Applicable or Relevant and Appropriate Requirements of Environmental Laws 10.1

10.2.1 Applicable or Relevant and Appropriate Requirements 10.1
10.2.1.1 Action-Specific 10.2
10.2.1.2 Chemical-Specific 10.2
10.2.1.3 Location-Specific 10.3
10.2.2 Information To-Be-Considered 10.4

10.3 Cost Effectiveness 10.4

10.4 Use of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable 10.4

10.5 Preference for Treatment as a Principal Element 10.5

11.0 References 11.1

Responsiveness Summary RS.1

Appendix A A.1

Figures

1.1 Map of Eielson Air Force Base 1.2

4.1 Location of OU1 Source Areas 4.2

4.2 Location of Blair Lakes Target Facility Source Areas 4.3

5.1 Benzene Concentrations in Groundwater, ST20 E-7 Complex 5.11

5.2 Benzene Concentrations in Groundwater, ST20 E-8 Complex 5.13

5.3 Groundwater Well and Probe Location, ST20 E-9 Complex 5.15

5.4 Benzene Concentrations in Groundwater, ST20 E-9 Complex 5.16

5.5 ST48 Floating Product 5.18

5.6 Groundwater Wells and Soil Boring Locations, ST48 ..... 5.20

5.7 Total Petroleum Hydrocarbon from Soil Borings, 1989, ST49 ..... 5.23

5.8 Water Table Map, Blair Lakes Target Facility 5.27

5.9 Top of Permafrost Subsurface, Blair Lakes Target Facility 5.30

Tables

5.1 Laboratory Analyses Performed, ST20 E-7 Complex 5.2
5.2 Laboratory Analyses Performed, ST20 E-8 Complex 5.3
5.3 Laboratory Analyses Performed, ST20 E-9 Complex 5.4
5.4 Laboratory Analyses Performed, ST48 ..... 5.5
5.5 Laboratory Analyses Performed, ST49 ..... 5.6
5.6 Laboratory Analyses Performed, Blair Lakes Target Facility 5.7
5.7 Blair Lakes Target Facility Aquifer Test Summary 5.31
6.1 Summary of Human Exposure Pathways for all Source Areas 6.2
6.2 Chemicals Detected in Surface Soils of ST20 E-7 ..... 6.5
6.3 Chemicals Detected in Subsurface Soils of ST20 E-7 ..... 6.6
6.4 Chemicals Detected in Groundwater of ST20 E-7 ..... 6.7
6.5 Chemicals Detected in Surface Soils of ST20 E-8 ..... 6.9
6.6 Chemicals Detected in Subsurface Soils of ST20 E-8 ..... 6.10
6.7 Chemicals Chemicals Detected in Groundwater of ST20 E-8 ..... 6.11
6.8 Chemicals Detected in Surface Soils of ST20 E-9 ..... 6.13
6.9 Chemicals Detected in Subsurface Soils of ST20 E-9 ..... 6.14
6.10 Chemicals Detected in Groundwater of ST20 E-9 ..... 6.15
6.11 Chemicals Detected in Surface Soils of ST48 ..... 6.17
6.12 Chemicals Detected in Subsurface Soils of ST48 ..... 6.18
6.13 Chemicals Detected in Groundwater of ST48 ..... 6.19
6.14 Chemicals Detected in Surface Soils of ST49 ..... 6.21

6.15 Chemicals Detected in Subsurface Soils of ST49 ..... 6.22

6.16 Chemicals Detected in Groundwater of ST49 ..... 6.23

6.17 Chemicals Detected in Surface Soils of ST50 (Blair Lakes) 6.25

6.18 Chemicals Detected in Subsurface Soils of ST50(Blair Lakes) 6.26

6.19 Chemicals Detected in Groundwater of ST50(Blair Lakes) 6.28

6.20 Toxicity Data 6.31

6.21 Summary of Cancer Risk and Hazard Index for the Reasonable Maximum Exposure Case, ST20 E-7 Complex 6.36

6.22 Summary of Cancer Risk and Hazard Index for the Reasonable Maximum Exposure Case, ST20 E-8 Complex 6.37

6.23 Summary of Cancer Risk and Hazard Index for the Maximum Exposure Case, ST20 E-9 Complex 6.38

6.24 Summary of Cancer Risk and Hazard Index for the Reasonable Maximum Exposure Case, ST48 ..... 6.39

6.25 Summary of Cancer Risk and Hazard Index for the Maximum Exposure Case, ST49 ..... 6.40

6.26 Summary of Cancer Risk and Hazard Index for the Maximum Exposure Case, Blair Lakes 6.41

6.27 Major Contributors to Risk by Source Area 6.43

7.1 Remedial Action Objectives for Environmental Media 7.1

7.2 Final Remediation Goals 7.2

7.3 Relationship Between Applicable or Relevant and Appropriate Requirements and Alternatives 7.5

8.1 Criteria for Comparison of Alternatives 8.1

8.2 Cost of Alternatives 8.4

10.1 Chemical-Specific Applicable or Relevant and Appropriate Requirements for Chemicals of Concern 10.3

Acronyms and Abbreviations

ADEC	Alaska Department of Environmental Conservation
AFB	Air Force Base
ARAR	applicable or relevant and appropriate requirement
bls	below land surface
BTEX	benzene, toluene, ethylbenzene, and xylene
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act*
DDT	dichlorodiphenyltrichloroethane
EPA	U.S. Environmental Protection Agency
FFA	*Federal Facility Agreement Under CERCLA Section 120*
FNSB	Fairbanks North Star Borough
FS	feasibility study
HI	hazard index
HQ	hazard quotient
IRP	Installation Restoration Program
L	liters
m	meters
MCL	maximum contaminant level
MEPAS	Multimedia Environmental Pollutant Assessment System
NPL	National Priorities List
OU	Operable Unit
OU1	Operable Unit 1
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
POL	petroleum, oil, and lubricant
RAO	remedial action objective
RCRA	*Resource Conservation and Recovery Act*
RI/FS	remedial investigation/feasibility study
SARA	*Superfund Amendments and Reauthorization Act*
SER	source evaluation report
TPH	total petroleum hydrocarbon
TRC	Technical Review Committee
UST	underground storage tank
VOC	volatile organic compound

Eielson Air Force Base
Operable Unit 1
Record of Decision

Decision Summary

1.0 Site Name, Location, and Description

Eielson Air Force Base (AFB) covers approximately 19,700 acres, and it is located along the Richardson Highway within the Fairbanks North Star Borough (FNSB) approximately 24 mi southeast of Fairbanks and 10 mi southeast of the city of North Pole, Alaska (Figure 1.1). Approximately 3,650 acres are improved or partially improved with the remaining land encompassing forest, wetlands, lakes, and ponds. The base is bounded on the east and south by Fort Wainwright, a U.S. Army installation, and on the west and north by private and public land. The base is adjacent to public and private land zoned for general use. The approximate population of the FNSB, Fairbanks, and North Pole is 82,000, 32,000, and 1,600, respectively. Other communities near Eielson AFB include Moose Creek, which abuts the northern border of the base, and the Salcha area, which abuts the southern border of the base.

Eielson AFB is a major employer in the Fairbanks area. The base employs approximately 3,400 military personnel and 500 civilians. The total residential population of Eielson AFB is 5,132. Residential and occupational populations are primarily concentrated in the developed portion of the base.

The area is active with ongoing base functions, including work, school, and recreational activities. The base contains three elementary schools and one junior-senior high school. There is one child care center and one medical and dental clinic.

The base is located in the Tanana River Valley. Most of the base has been constructed on fill material. The developed portion of the base's topography is generally flat and somewhat featureless with elevations averaging about 550 ft above mean sea level. The undeveloped east and northeast sides of the base are as high as 1,125 ft above mean sea level. Two-thirds of the base is covered with soils containing discontinuous permafrost. Half of the potential agricultural soils are currently being used for recreational facilities, ammunition storage areas, Arctic Survival Training School, and other U.S. Air Force developments.

Significant wildlife frequents Eielson AFB, and the base supports a variety of recreational and hunting opportunities. No resident threatened or endangered species live on the base.

The developed portion of the base is underlain by a shallow, unconfined aquifer comprised of 200 to 300 ft of loose alluvial sands and gravel overlying relatively low-permeability bedrock. The aquifer is characterized by high transmissivities and relatively flat groundwater gradients. Groundwater is generally encountered at approximately 8 ft below grade with seasonal

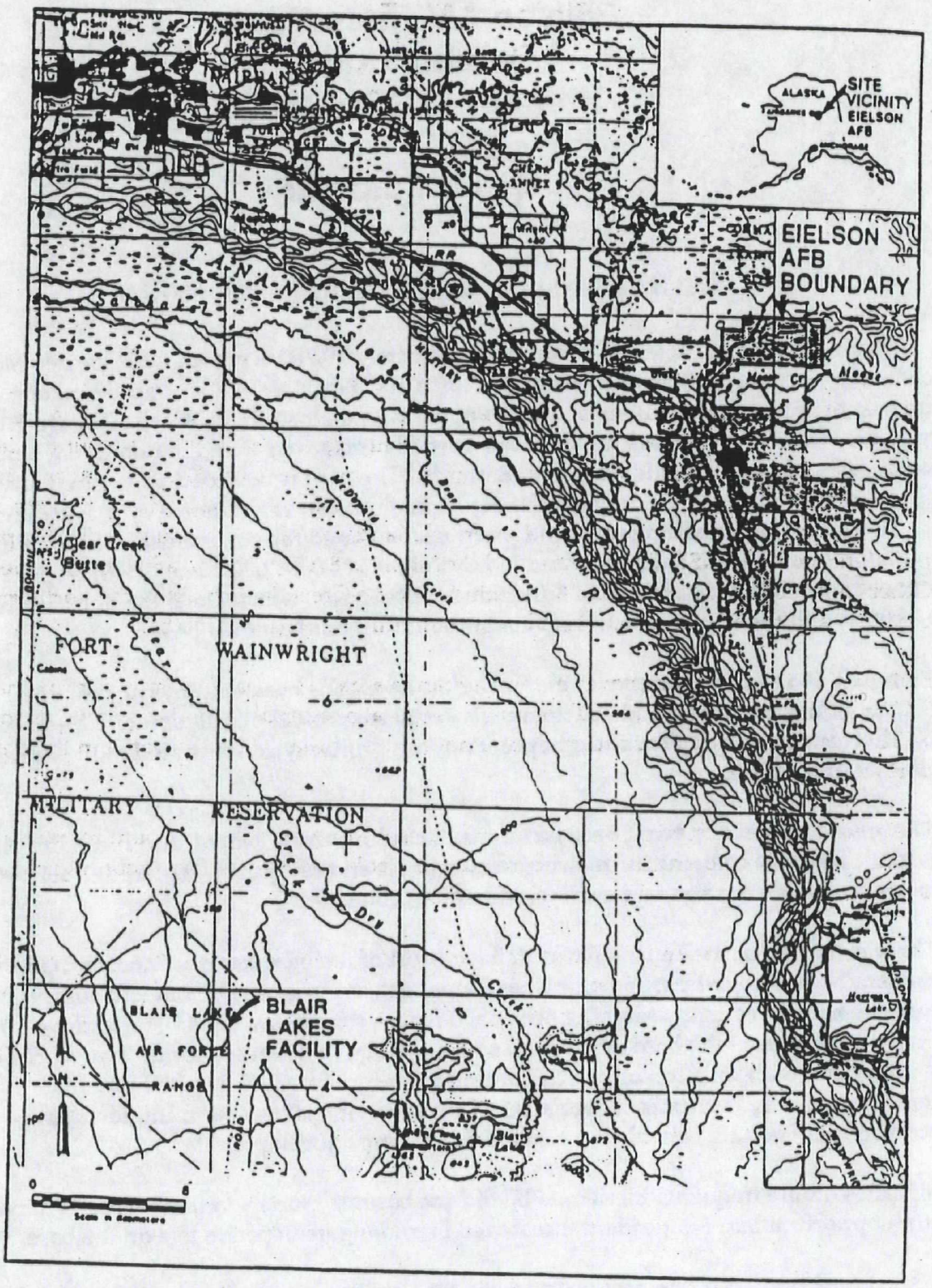


Figure 1.1. Map of Eielson Air Force Base

fluctuations up to 1.5 ft. The groundwater generally flows to the north-northwest with the direction of the flow locally influenced by surface water bodies (e.g., Garrison Slough and Hardfill Lake) and groundwater extraction from the base supply wells. Groundwater is the only source of potable water at the base and in the nearby communities. Potable water in the main base system is treated to remove iron and sulfide. Groundwater is the principal source for various industrial, domestic, agricultural, and fire-fighting purposes.

2.0 Site History and Enforcement Activities

Eielson AFB was established in 1944, and military operations have continued to the present. The mission of Eielson AFB is to train and equip personnel for close air support of ground troops in an arctic environment. Eielson AFB operations include industrial areas, aircraft maintenance and operations, an active runway and associated facilities, administrative offices, and residential and recreational facilities.

In carrying out its defense mission, the soils and groundwater at the base have been contaminated from the storage and handling of fuels and solvents plus the operation of landfills. Initially, this contamination was evaluated under the U.S. Air Force Installation Restoration Program (IRP). The four-phase IRP was initiated in 1982 with a Phase 1 records search to identify past disposal sites containing contaminants that may pose a hazard to human health or the environment. Under the IRP, the U.S. Air Force identified potential areas of contamination at Eielson AFB. Potential source areas included old landfills, storage and disposal areas, fueling system leaks, and spill areas.

Eielson AFB was listed on the National Priorities List (NPL) (54 FR 48184) on November 21, 1989, by the U.S. Environmental Protection Agency (EPA). This listing designated the facility as a federal Superfund site subject to the remedial response requirements of the *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA), as amended by the *Superfund Amendments and Reauthorization Act* (SARA).

In May 1991, the U.S. Air Force, the State of Alaska, and EPA entered into the *Federal Facility Agreement* (FFA), under CERCLA Section 120 (U.S. Environmental Protection Agency et al. 1991), which established the procedural framework and schedule for developing, implementing, and monitoring CERCLA response actions. An additional goal of the FFA was to integrate the U.S. Air Force's CERCLA response obligations and *Resource Conservation and Recovery Act* (RCRA) corrective action obligations. Under the FFA, potential source areas were placed in one of six operable units (OUs), based on similar contaminant and environmental characteristics, or were included for evaluation under a source evaluation report (SER).

3.0 Highlights of Community Participation

After the signing of the FFA (EPA et al. 1991) with the State of Alaska and the EPA, and the listing of Eielson AFB on the NPL, the U.S. Air Force began its Superfund clean-up program. As part of this program, in accordance with CERCLA Sections 113(k)(2)(B)(i-v) and 117, an extensive community relations program was initiated to involve the community in the decision-making process.

The community relations staff interviewed 40 local residents and community leaders to develop plans to keep residents informed about the clean-up activity at Eielson AFB. Follow-up interviews and questionnaires of more than 100 residents helped revise the community relations plan. An environmental clean-up newsletter was created and mailed to anyone who wished to be on the mailing list. Fact sheets were prepared on various topics related to the clean-up operations. Several times a year articles describing significant clean-up events were released to the base newspaper *Goldpanner* and the *Fairbanks Daily News Miner*. All of these efforts are designed to involve the community in the cleanup process.

The remedial investigation/feasibility study (RI/FS) (U.S. Air Force 1994a, 1994b, 1994c) and Proposed Plan (U.S. Air Force 1994d) for Operable Unit 1 (OU1) of Eielson AFB were released to the public in May 1994. These documents were made available to the public in both the administrative record and an information repository maintained at the Elmer E. Rasmusen Library at the University of Alaska, Fairbanks.

The public comment period for the Proposed Plan was held from May 30 to June 30, 1994. Comments received during this period are summarized in the Responsiveness Summary of this record of decision. The Proposed Plan for OU1 was advertised in the *Fairbanks Daily News Miner*, June 4, 1994. A story on the same plan appeared in the *North Pole Independent*, June 3, 1994. The public meeting for OU1 was advertised in the *Fairbanks Daily News Miner*, June 21, 1994. A news release was sent to all local news media announcing the Proposed Plan and public meeting.

A Technical Review Committee (TRC) was established in 1992 including three representatives for the community (selected by local officials and the University of Alaska Fairbanks Chancellor), industry representatives and environmental agency representatives. In November 1993, a local environmental interest group was invited to participate.

The Air Force's preferred cleanup alternatives were presented to a TRC on January 27, 1994. At this meeting, representatives from the U.S. Air Force, Alaska Department of Environmental Conservation (ADEC), and EPA responded to questions from the committee representing the University of Alaska, the city of North Pole, and various state and federal agencies.

A public meeting was held on June 22, 1994. At this meeting, representatives from the U.S. Air Force, ADEC, and EPA answered questions about problems at the sites and the remedial alternatives under consideration. Twenty five people attended. The majority of those attending were civilian or military employees of Eielson AFB.

One formal comment was received in response to the Proposed Plan and public meeting. A written comment expressed support for the selected remedial action for OU1 and the U.S. Air Force efforts to "insure the future well being of the state and health of its residents." No formal comments were received during the public meeting, however, an individual asked how the selected alternative would be applied under the existing taxiway. The questioner agreed with the response that horizontal drilling could be employed.

4.0 Scope and Role of Operable Unit

As with many Superfund sites, the problems at Eielson AFB are complex. Thus, the FFA (EPA et al. 1991) divided the potential source areas at Eielson AFB into six OUs and three SER groups based on common characteristics and contaminants. A final sitewide study is also being conducted to evaluate cumulative human health and ecological risks.

The grouping of potential source areas into OUs was based on similar source characteristics or contaminants. The OUs are

- OU 1 Petroleum, Oil, and Lubricant (POL) Contamination
- OU 2 POL Contamination
- OU 3 Solvent Contamination
- OU 4 Land Disposal of Fuel Tank Sludge, Drums, and Asphalt
- OU 5 Landfills
- OU 6 Ski Lodge Well Contamination.

An RI/FS was completed in May 1994 for OU1. At OU1B, a 1992 ROD selected interim actions to be taken at source areas ST20 (E-7 and E-9 Complexes), Blair Lakes, ST48, and ST49 in June 1992 to remove petroleum contamination in the subsurface (the interim actions are described in Section 5.0). OUs 2 and 6 are in the remedy selection process. OUs 3, 4, and 5 are in the RI/FS stage. The interim actions are described in Section 5.0

Eight source areas (see Figures 4.1 and 4.2) with petroleum contamination were designated under OU1:

- ST20E-7, E-8, and E-9 Complexes (Refueling Loop)
- ST48Power Plant Area
- ST49Alert Hanger
- SS50Blair Lakes Vehicle Maintenance
- SS51Blair Lakes Ditch
- SS52Blair Lakes Diesel Spill
- SS53Blair Lakes Fuel Spill
- DP54Blair Lakes Drum Disposal Site.

OU1 addresses sites contaminated by leaks and spills of fuels. Soils contaminated with petroleum products occur at or near the source of contamination. Contaminated subsurface soil and groundwater occurs in plumes on the top of a shallow groundwater table that fluctuates seasonally (see Section 1.0 for discussion of groundwater). Most of the contamination is in subsurface soils and the shallow groundwater. Much of the groundwater contamination is believed to migrate from the smear zone because of fluctuations in the groundwater table, rather than infiltration from precipitation. These eight source areas pose varying risks to human health and the environment because of the possibility for ingestion,

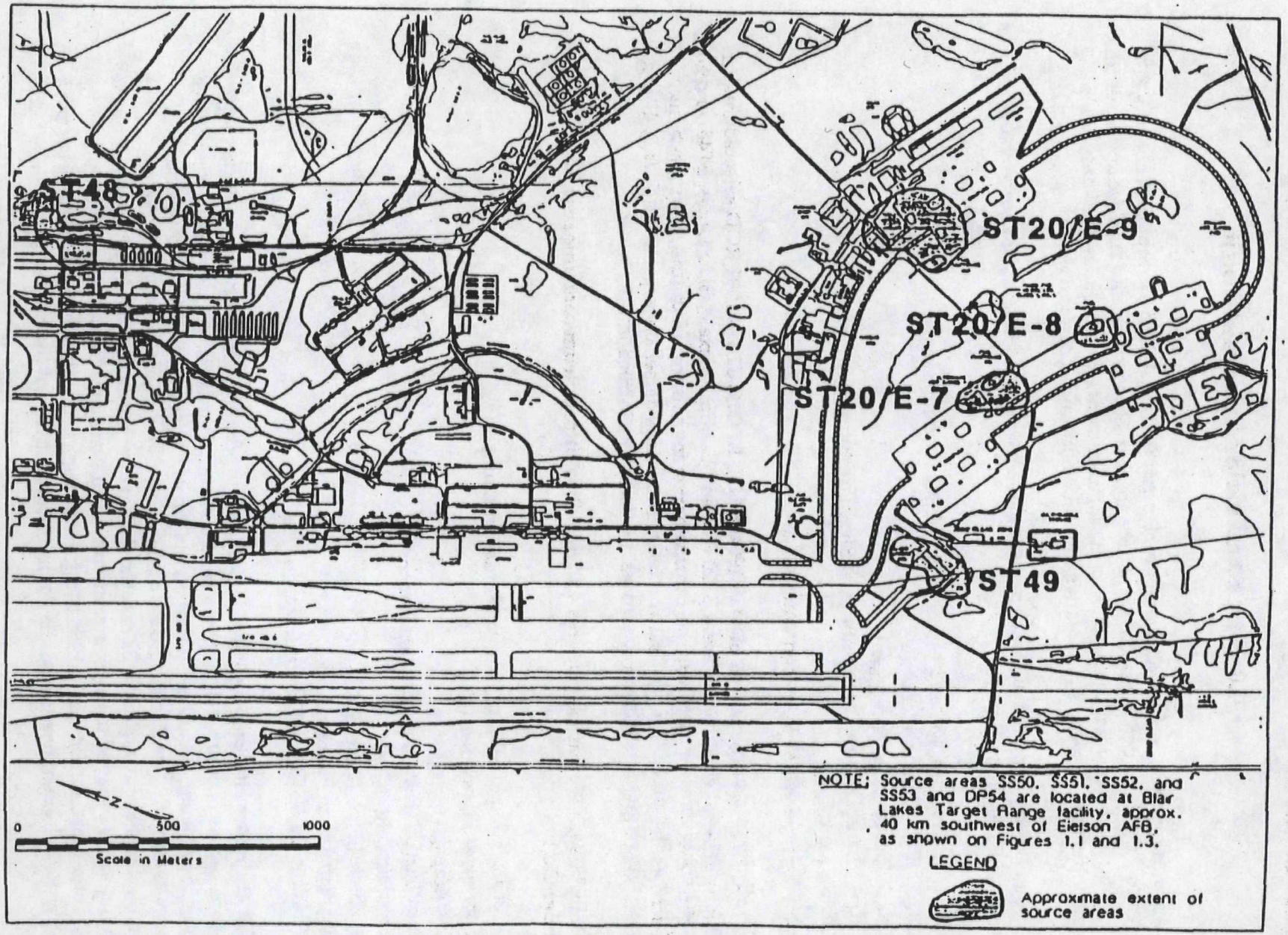
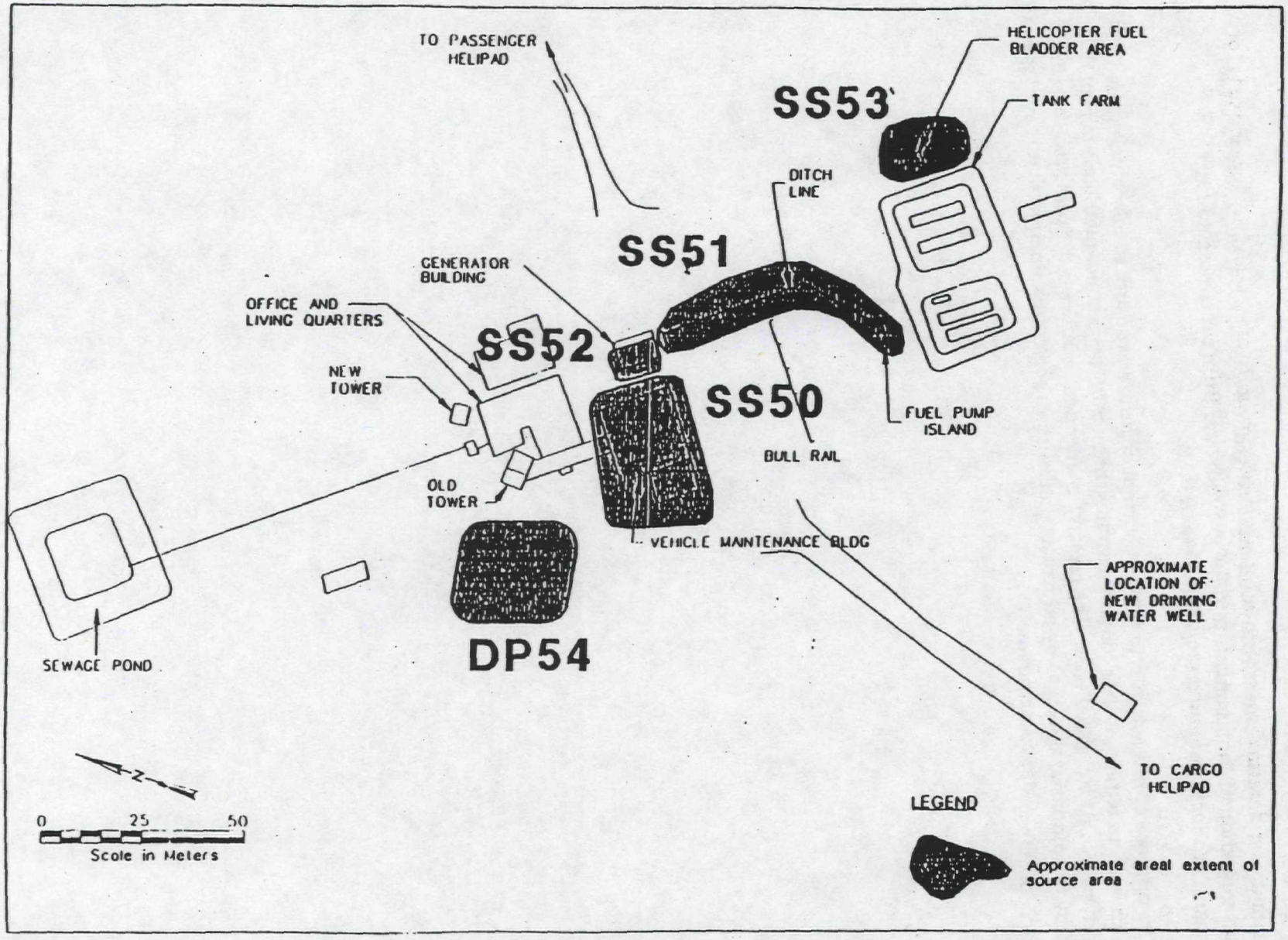


Figure 4.1. Location of OU1 Source Areas



JAML:OU114.DGN

Figure 4.2. Location of Blair Lakes Target Facility Source Areas

inhalation, and dermal contact with contaminated groundwater. Also, the threat exists for further migration of contaminants into the groundwater from contaminated soils and petroleum products floating on top of the water table.

The purpose of this action is to prevent current or future exposure to the contaminated groundwater, to reduce further contaminant migration into the groundwater, and to return groundwater to its beneficial uses. The remedy is intended to address the principal threats posed by conditions at the areas by addressing subsurface soil contamination that is acting as a source of groundwater contamination.

5.0 Summary of Site Characteristics

Contamination at the OU1 source areas has been investigated in detail since 1982. CH2M Hill conducted a records search on some of the OU1 source areas. Dames & Moore continued the investigations in 1985 (Dames & Moore 1985). Harding Lawson Associates collected and analyzed soil gas, soil, and groundwater samples in 1988 and 1989 (HLA 1989, 1990, 1991). Pacific Northwest Laboratory[a] collected and analyzed soil, sediment, surface water, and groundwater samples in 1993. The analytes of interest list was very comprehensive and included volatile organic compounds (VOCs), semivolatile organic compounds, pesticides, polychlorinated biphenyls (PCBs), anions, and metals. The analytes and media sampled (groundwater, surface water, and soil) are summarized for each source area in the following text, and in Tables 5.1 through 5.6.

The analytical data collected for each source area is represented in Appendix A which is reproduced in total from Appendix viii of the OU1 Remedial Investigation Report (U.S. Air Force 1994a). Each analyte sampled for is presented by source area and media (soil and water). Shown for each analyte are: detection limit, number of samples, number of detects, minimum and maximum detects, and the location of the maximum detect.

There is only one aquifer for the OU1 source areas within the main base. Site characteristics for Blair Lakes are described in Section 5.4. The unconfined aquifer consists of alluvial sands and gravels. It is 200 to 300 ft thick and overlies crystalline bedrock (Birch Creek Schist). Within this unit only the upper 60 to 90 ft were characterized during this investigation. The aquifer was found to be relatively homogeneous between areas of investigation. The layering of materials indicates a greater horizontal than vertical permeability.

Groundwater is the only source of potable water used at Eielson AFB. This water is supplied by three large-capacity wells of 1,000 to 2,000 gal/min capacity. The base water supply wells are completed at depths averaging approximately 100 ft. Seven wells are designated to provide water to fight fires on the base and are designed for emergency use only. These wells are plumbed to the water supply system. In addition to the base water supply wells, 41 private wells are within a 3-mi radius of the base, most of which are located downgradient of the base (north-northwest of the base) in or near the community of Moose Creek (Figure 1.1) and in agricultural areas west of the base (HLA 1991). The city of North Pole is served by a small public water supply system plus private wells.

The magnitude of the horizontal gradient was calculated for the OU1 source areas. The average horizontal gradient is approximately 0.001 ft/ft. Data from a pumping test, slug tests, and grain size analyses were used to estimate a hydraulic conductivity of approximately 200 ft/day.

---

[a] Pacific Northwest Laboratory is operated by Battelle Memorial Institute for the U.S. Department of Energy under Contract DE-AC06-76RLO 1830.

Table 5.1. Laboratory Analyses Performed, ST20 E-7 Complex

Parameter	Analytical Method	Groundwater					Surface Water		Soils				Surface Soil	Subsurface Soil	Sediment
		1984[a]	1986[b]	1988[c]	1989[d]	1993[e]	1989[d]	1993[e]	1984[a]	1986[b]	1988[c]	1989	1993[e]	1993[e]	1993
Halogenated volatile organics	SW-846, 8010	-	-	X[f]	-	X	-	X	-	-	-	-	-	X	X
Aromatic volatile organics	SW-846, 8020	-	-	X	X	X	X	X	-	-	-	-	-	X	X
Volatile organic compounds	SW-846, 8420	-	X	-	-	-	-	-	-	X[g]	X	-	-	-	-
Semivolatile organic compounds	SW-846, 8270	-	-	X	-	X	-	-	-	-	X[f]	-	-	X	X
Organochlorine pesticides and PCBs	SW-846, 8080	-	-	-	-	-	-	-	-	-	X[f]	-	X	X	X
Hydrocarbon fingerprint	SW-846, 8015	-	-	X	-	-	-	-	-	-	-	-	-	-	-
Petroleum hydrocarbons	E418.1	-	X	X	X	-	X	-	-	-	X	-	-	-	-
TPH - gas range	AK101	-	-	-	-	-	-	-	-	-	-	-	-	X	-
TPH - diesel range	AK102	-	-	-	-	-	-	-	-	-	-	-	-	X	-
Arsenic	SW-846, 7060	-	-	X[f,h]	-	X	-	X	-	-	-	-	-	X	X
Lead	SW-846, 7421	Å[f]	-	X[f,h]	-	X	-	X	-	-	-	-	-	X	X
Mercury	SW-846, 7470	-	-	X[f,h]	-	X	-	X	-	-	-	-	-	X	X
ICP metals scan	SW-846, 6010	-	-	X[f,h]	-	X	-	X	-	-	-	-	-	X	X
Total dissolved solids	E160.1	-	-	Å	-	-	-	-	-	-	-	-	-	-	-
Common anions	E300	-	-	X[f]	-	-	-	-	-	-	-	-	-	-	-
Nitrogen	E353.2	-	-	X	-	-	-	-	-	-	-	-	-	-	-
Oil and grease	E413.20	Å	X	-	-	-	-	-	Å	-	-	-	-	-	-
Total organic compounds	E415.1	Å	X	-	-	-	-	-	-	-	-	-	-	-	Å
Total organic halogens	SW-846, 9020	Å	-	-	-	-	-	-	-	-	-	-	-	-	-
Moisture	D2216	-	-	-	-	-	-	-	-	-	-	-	-	Å	-

X=Analyzed.
- =Not analyzed.
Å =Data not in OU1 database.
(a)Dames and Moore 1985.
(b)SAIC 1989b.
(c)HLA 1989.
(d)HLA 1990.
(e)U.S. Air Force 1994a.
(f)Analysis performed for 53M04 only.
(g)Method E625.
(h)Total and dissolved analyses performed.
(i)Method 239.2.

Table 5.2. Laboratory Analyses Performed, ST20 E-8 Complex

Parameter	Analytical Method	Groundwater				Soil			Surface Soil	Subsurface Soil
		1986[a]	1988[b]	1989[c]	1993[d]	1986[a]	1988[b]	1989[c]	1993[d]	1993[d]
Halogenated volatile organics	SW-846, 8010	-	-	-	X	-	-	-	-	-
Aromatics volatile organics	SW-846, 8020	-	X	X	X	-	-	-	-	-
Volatile organic compounds	SW-846, 8240	X	-	-	-	X[e]	X	X[f]	-	-
Semivolatile organic compounds	SW-846, 8270	-	X	X	X	-	-	X	-	X
Organochlorine pesticides and PCBs	SW-846, 8080	-	-	-	-	-	-	-	X	-
Hydrocarbon fingerprint	SW-846, 8015	-	X	-	-	-	-	-	-	-
Petroleum hydrocarbons	E418.1	X	X	X	-	-	X	X	-	-
TPH - gas range	AK101	-	-	-	-	-	-	-	-	-
TPH - diesel range	AK102	-	-	-	-	-	-	-	-	-
Arsenic	SW-846, 7060	-	-	-	X	-	-	-	-	-
Lead	SW-846, 7421	-	-	-	X	-	-	-	-	-
Mercury	SW-846, 7470	-	-	-	X	-	-	-	-	-
ICP metals scan	SW-846, 6010	-	-	-	X	-	-	-	-	-
Total dissolved solids	E160.1	-	X	-	-	-	-	-	-	-
Common anions	E300	-	-	-	-	-	-	-	-	-
Nitrogen	E353.2	-	X	-	-	-	-	-	-	-
Oil and grease	E413.2	X	-	-	-	-	-	-	-	-
Total organic compounds	E415.1	X	-	-	-	-	-	-	-	-
Total organic halogens	SW-846, 9020	-	-	-	-	-	-	-	-	-
Moisture	D2216	-	-	-	-	-	-	X	-	-

X = Analyzed.
- = Not analyzed.
(a) SAIC 1989b.
(b) HLA 1989.
(c) HLA 1990.
(d) U.S. Air Force 1994a.
(e) Method E624.
(f) Analytical method not verified.

Table 5.3. Laboratory Analyses Performed, ST20 E-9 Complex

Parameter	Analytical Method	Groundwater				Soil			Surface Soil	Subsurface Soil
		1986[a]	1988[b]	1989[c]	1993[d]	1986[a]	1988[b]	1989[c]	1993[d]	1993[d]
Halogenated volatile organics	SW-846, 8010	-	-	-	X	-	-	-	-	X
Aromatic volatile organics	SW-846, 8020	-	X	X	X	-	-	-	-	X
Volatile organic compounds	SW-846, 8240	X	-	-	-	X[e]	X	X	-	-
Semivolatile organic compounds	SW-846, 8270	-	X	X	X	-	-	X	X	X
Organochlorine pesticides and PCBs	SW-846, 8080	-	-	-	-	-	-	-	X	X
Hydrocarbon fingerprint	SW-846, 8015	-	-	-	-	-	-	-	-	-
Petroleum hydrocarbons	E418.1	X	X	X	-	-	X	X	-	-
TPH - gas range	AK101	-	-	-	-	-	-	-	-	X
TPH - diesel range	AK102	-	-	-	-	-	-	-	-	X
Arsenic	SW-846, 7060	-	-	-	X	-	-	-	-	X
Lead	SW-846, 7421	-	-	-	X	-	-	-	-	X
Mercury	SW-846, 7470	-	-	-	X	-	-	-	-	X
ICP metals scan	SW-846, 6010	-	-	-	X	-	-	-	-	X
Total dissolved solids	E160.1	-	X	-	-	-	-	-	-	-
Common anions	E300	-	-	-	-	-	-	-	-	-
Nitrogen	E353.2	-	X	-	-	-	-	-	-	-
Oil and grease	E413.2	X	-	-	-	-	-	-	-	-
Total organic compounds	E415.1	X	-	-	-	-	-	-	-	-
Total organic halogens	SW-846, 9020	-	-	-	-	-	-	-	-	-
Moisture	D2216	-	-	-	-	-	-	X	-	⊗

X = Analyzed.
- = Not analyzed.
(a) SAIC 1989b.
(b) HLA 1989.
(c) HLA 1990.
(d) U.S. Air Force 1994a.
(e) Method E624.

Table 5.4. Laboratory Analyses Performed, ST48

Parameter	Analytical Method	Groundwater			Soil		Surface Soil	Subsurface Soil
		1988[a]	1989[b]	1993[c]	1988[a]	1989[b]	1993[c]	1993[c]
Halogenated volatile organics	SW-846, 8010	X	-	X	-	-	-	-
Aromatic, volatile organics	SW-846, 8020	X	X	X	-	-	-	-
Volatile organic compounds	SW-846, 8240	-	-	-	X	-	-	-
Semivolatile organic compounds	SW-846, 8270	X	X	X	X	-	X	X
Organochlorine pesticides and PCBs	SW-846, 8080	-	-	-	⊗[d]	-	X	X
Hydrocarbon fingerprint	SW-846, 8015	⊗	-	-	-	-	-	-
Petroleum hydrocarbons	E418.1	X	X	-	X	X	-	-
TPH - gas range	AK101	-	-	-	-	-	X	X
TPH - diesel range	AK102	-	-	-	-	-	X	X
Arsenic	SW-846, 7060	X[e,f]	-	X	-	-	-	X
Lead	SW-846, 7421	X[e]	-	X	X[g]	-	-	X
Mercury	SW-846, 7470	X[e,f]	-	X	-	-	-	X
ICP metals scan	SW-846, 6010	X[e,f]	-	X	-	-	-	X
Total dissolved solids	E160.1	X	-	-	-	-	-	-
Common anions	E300	X[e]	-	-	-	-	-	-
Nitrogen	E353.2	X	-	-	-	-	-	-
Oil and grease	E413.2	-	-	-	-	-	-	-
Total organic compounds	E415.1	-	-	-	-	-	-	-
Total organic halogens	SW-846, 9020	-	-	-	-	-	-	-
Moisture	D2216	-	-	-	X	X	-	X

X = Analyzed.
- = Not analyzed.
⊗ = Data not in OU1 database.
(a) HLA 1989.
(b) HLA 1990.
(c) U.S. Air Force 1994a.
(d) Analysis only performed on 1 soil sample from well 53M03 boring.
(e) Total and dissolved analyses performed.
(f) Analysis only performed on sample from well 53M03.
(g) Lead analysis performed on all well boring soil samples except well 53M03.

Table 5.5. Laboratory Analyses Performed, ST49

Parameter	Analytical Method	Groundwater			Surface Water	Soil		Surface Soil	Subsurface Soil	Sediment
		1988[a]	1989[b]	1993[c]	1993[c]	1988[a]	1989[b]	1993[c]	1993[c]	1993[c]
Halogenated volatile organics	SW-846, 8010	X	X	X	X	-	-	X	X	X
Aromatic volatile organics	SW-846, 8020	X	X	X	X	-	-	X	X	X
Nonhalogenated volatile organics	SW-846, 8015	X	-	-	-	-	-	-	-	-
Volatile organic compounds	SW-846, 8240	-	-	-	-	⊗	-	-	-	-
Semivolatile organic compounds	SW-846, 8270	X	X	X	-	X	-	X	X	X
Polycyclic aromatic hydrocarbons	SW-846, 8310	-	X	-	-	-	-	-	-	-
Organochlorine pesticides and PCBs	SW-846, 8080	-	-	-	-	X[d]	-	X	-	X
Hydrocarbon fingerprint	SW-846, 8015	⊗ [e]	-	-	-	-	-	-	-	-
Petroleum hydrocarbons	E418.1	X	X	-	-	X	X	-	-	-
TPH - gas range	AK101	-	-	-	-	-	-	X	X	-
TPH - diesel range	AK102	-	-	-	-	-	-	X	X	-
Arsenic	SW-846, 7060	X[f,g]	-	X	X	-	-	-	-	X
Lead	SW-846, 7421	X[f,g]	-	X	X	X	-	-	-	X
Mercury	SW-846, 7470	-	-	X	X	-	-	-	-	X
ICP metals scan	SW-846, 6010	X[f,g]	-	X	X	X	-	-	-	X
Total dissolved solids	E160.1	X	-	-	-	-	-	-	-	-
Common anions	E300	X[g]	-	-	-	-	-	-	-	-
Nitrogen	E353.2	-	-	-	-	-	-	-	-	-
Oil and grease	E413.2	-	-	-	-	-	-	-	-	-
Total organic compounds	E415.1	-	-	-	-	-	-	-	-	⊗
Total organic halogens	SW-846, 9020	-	-	-	-	-	-	-	-	-
Moisture	D2216	-	-	-	-	-	X	-	-	-

X = Analyzed.
- = Not analyzed.
⊗ = Data not in OU1 database.
(a) HLA 1989.
(b) HLA 1990.
(c) U.S. Air Force 1994a.
(d) Analysis only performed on two soil samples from well 53M05 boring.
(e) Modified SW8015.
(f) Total and dissolved analyses performed.
(g) Analysis only performed on sample from well 53M05.

Table 5.6. Laboratory Analyses Performed, Blair Lakes Target Facility

Parameter	Analytical Method	Groundwater			Soil		Surface Soil	Subsurface Soil
		1988[a]	1989[b]	1993[c]	1988[a]	1989[b]	1993[c]	1993[c]
Halogenated volatile organics	SW8010	X	X	X	-	-	-	-
Aromatic, volatile organics	SW8020	X	X	X	-	-	-	-
Volatile organic compounds	SW8240	-	-	-	X	X[d]	-	-
Semivolatile organic compounds	SW8270	X	X	X	X	X	-	-
Organochlorine pesticides and PCBs	SW8080	-	-	-	-	-	X	-
Hydrocarbon fingerprint	SW8015	⊗	-	-	-	-	-	-
Petroleum hydrocarbons	E418.1	X	X	-	X	X	-	-
TPH - gas range	AK101	-	-	-	-	-	-	X
TPH - diesel range	AK102	-	-	-	-	-	-	X
Arsenic	SW7060	X	-	X	X	-	-	X
Lead	SW7421	X	-	X	X	-	-	X
Mercury	SW7470	-	-	X	-	-	-	X
ICP metals scan	SW6010	X	-	X	X	-	-	X
Total dissolved solids	E160.1	X	-	X	-	-	-	-
Common anions	E300	X	-	X	-	-	-	-
Nitrogen	E353.2	X	-	-	-	-	-	-
Oil and grease	E413.2	-	-	-	-	-	-	-
Total organic compounds	E415.1	-	-	⊗	-	-	-	-
Total organic halogens	SW9020	-	-	-	-	-	-	-
Moisture	D2216	-	-	-	X	X	-	-
Alkalinity	E310.2	-	-	X	-	-	-	-

X = Analyzed.
- = Not analyzed.
⊗ = Data not in OU1 database.
(a) HLA 1989.
(b) HLA 1990.
(c) U.S. Air Force 1994a.
(d) Analysis performed on only five samples from the borings of the four new monitoring wells.

Water levels from nested wells at source areas ST48 and OU2 source areas ST10, ST18, and DP26 were compared to provide information about vertical hydraulic gradients. The shallow wells generally have a 20-ft screen, beginning near the top of the aquifer, which is approximately 10 ft below ground surface. The intermediate wells generally have a 10-ft screen, beginning at approximately 30 ft below ground surface. Pressure head differences between the shallow and intermediate wells were smaller than the potential error of the instruments. Therefore, the vertical gradient is negligible.

The direction of groundwater flow within the main base is north-northwest. Locally, groundwater flow is influenced by Garrison Slough, Hardfill Lake, and pumpage of base water supply wells. The direction of groundwater flow appears to be fairly constant year-round.

Seasonal changes in water levels were interpreted using a precipitation hydrography, snowpack data, and temperature data, primarily collected in 1991 and 1992. In general, the aquifer fluctuated uniformly across the site, indicating that similar hydrogeological conditions exist in the upper 100 ft of the aquifer at all source areas. Typically, the water table reaches its minimum elevation in November. During this period, the discharge from the aquifer to the Tanana River and its tributaries exceeds recharge. In April, the water table typically rises about 1 to 2 ft and a maximum is observed in the last week of May. This major recharge event coincides with the spring thaw, when runoff from the snowmelt is at a maximum. The water table drops relatively rapidly after the end of May.

Two OU1 source areas are adjacent to surface water bodies. ST49 is adjacent to Garrison Slough, and ST20 is adjacent to a lake in the center of the refueling loop. The interrelationship between groundwater and surface waters at these source areas is discussed in the following descriptions.

Interim actions were taken at some of the source areas in OU1 under the interim record of decision for OU1B (U.S. Air Force 1992). Actions were taken at ST20 E-7 and E-9 Complexes, ST48, and Blair Lakes. These interim actions are discussed in the following descriptions.

5.1 Source Area ST20 Refueling Loop (E-7, E-8, and E-9 Complexes)

Source area ST20 contains three refueling complexes (E-7, E-8, and E-9). Each complex consists of an asphalt pad centered along the taxiway with adjacent unpaved areas of gravel and grass. The complexes are served by a fuel pump house with three associated 190,000-L JP-4 underground storage tanks (UST) and one 95,000-L defuel UST along with fueling and defueling transfer pipes. The large area enclosed by the taxiway loop, north of the complex, contains surface water ponds. Garrison Slough is approximately 300 meters southwest of the complex.

The majority of aircraft refueling operations are conducted at the refueling loop, and numerous fuel spills have occurred there in the past. The source of contamination at the E-7 Complex is believed to be leaks in the subsurface JP-4 fueling and defueling transfer pipes.

The source of contamination at the E-8 Complex is believed to be surface spills of JP-4 jet fuel resulting from overfilling of storage tanks.

Eielson AFB Liquid Fuels Department records indicate three spills at the E-9 Refueling Loop. Leak 1 was detected August 1988 and repaired June 1989. The leak was extensive; the amount of fuel lost is unknown. After the leak was repaired, a leak test was conducted on the piping. During this test, contractors noticed fuel farther out on the tarmac seeping up through cracks (Leak 2). The age of this leak is unknown. This leak was repaired in June 1989. The third leak was discovered near the refueling building in June 1992 and repaired in July 1992. It occurred in the line to the defueling tank. The amount leaked is unknown.

Contaminants typically associated with JP-4 fuel include TPHs, VOCs (BTEX), and semi-volatile organic compounds (naphthalenes). Soil and groundwater analytical data for ST 20 is presented in the Appendix.

Interim Actions at the E-7 Complex

Floating petroleum products were encountered in 1982 in a 6-m test hole at the E-7 pump house (CH2M Hill 1982). In July 1987, a 30-cm-thick layer of floating product was observed in a ditch excavated during maintenance work on an underground defueling line immediately north of the E-7 pump house. Three static recovery wells subsequently were installed in the leak area and operated until February 1988; 3,350 L of JP-4 fuel were recovered before flow to the system was restricted (HLA 1990). Another static recovery well was installed in late 1988; as of December 1989, approximately 40 L of fuel had been recovered (HLA 1990). The recovery well was abandoned some time before October 1991.

Bioventing, described in the Interim Remedial Action Record of Decision (U.S. Air Force 1992), was selected as the interim remedial action for the ST20 E-7 Complex. A bioventing treatability study was conducted by Battelle Columbus at the ST20 E-7 Complex and ran until December 1993. Three areas were tested for enhanced microbial degradation of fuel hydrocarbons in soil: ambient air was circulated in one area; hot air was circulated in a second area; and heated groundwater was recirculated in addition to hot air circulation in a third area. The data available from this study indicate that bioventing is successful in reducing contaminant concentrations.

Interim Actions at the E-8 Complex

No interim remedial action was selected for the ST20 E-8 Complex in the Interim Remedial Action Record of Decision (U.S. Air Force 1992).

Interim Actions at the E-9 Complex

Four test trenches were excavated in August 1992 to test the feasibility of removing free product, and one extraction trench was built in September 1992. A single recovery well (20RW04) was installed. To date, no petroleum products have been recovered from either the extraction trench or the recovery well. The product is apparently at lower pore pressures than atmospheric pressure and is not flowing into the recovery structures. A passive skimmer placed in well 20M25 in 1989 has recovered approximately 5 gal of petroleum product as of April 1993. In addition to the probes and recovery structures, seven vadose wells and one

deep air injection well were installed to support future vapor extraction and bioventing remedial actions at the ST20 E-9 Complex.

In addition to the ongoing interim remedial actions at the refueling loop, the U.S. Air Force conducted a tank tightness and pipeline leak detection investigation of USTs and associated transfer piping in 1993. Leaks identified in the testing were fixed or the line was taken out of service.

5.1.1 Soil Contamination at the E-7 Complex

Twelve soil samples were analyzed for volatile organic analytes in 1986; nine soil samples were analyzed for volatile organic analytes from 1988 to 1989; three soil samples were analyzed for volatile organic analytes in 1993. No subsurface TPH contamination in excess of 100 mg/kg was identified in soil. However, areas of elevated TPH and BTEX are likely to be present near the free product pool, where smearing of the floating product caused by seasonal changes in the water table is expected to have occurred (smear zone).

5.1.2 Groundwater Contamination at the E-7 Complex

Groundwater contamination at concentrations exceeding the *Safe Drinking Water Act* maximum contaminant levels (MCLs) and action levels were identified for benzene and toluene. The MCL for benzene is 5 mg/L; the MCL for toluene is 1,000 mg/L. The highest BTEX concentrations occur in the same monitoring wells that contain floating product. The downgradient extent of benzene contamination in groundwater has been defined by the groundwater probe and monitoring well data collected in 1988, 1989, and 1993. A comparison of data for 1988, 1989, and 1993 shows that benzene concentrations within the plume are decreasing. In 1989, the highest concentration of benzene was 12,000 mg/L in well 53M04 (Figure 5.1). In 1993, the concentration in this well was 200 mg/L.

In addition to the petroleum-related contamination at the E-7 Complex, 2-methylphenol, 4-methylphenol, and acetophenone (all semivolatile compounds) were found.

5.1.3 Floating Fuel at the E-7 Complex

In 1988 and 1989, up to nine wells and product probes reported floating fuel product. Well 20M04 had a reported thickness of 51.8 cm. In May 1993, product thickness was detected in only one well, 20M04 (65.2 cm), and in one product probe, 20PP12 (12.19 cm). The lateral extent of the product has diminished, but product thickness has increased slightly at well 20M04.

5.1.4 Source Area Hydrology at the E-7 Complex

Using the range of hydraulic conductivities (61.0 to 366 m/day) from aquifer tests on Eielson AFB, an effective porosity of 0.3, and gradients calculated from the water levels in wells, the mean direction of groundwater flow is to the northwest (307 to 330° azimuth) at a calculated speed of 0.53 m/day.

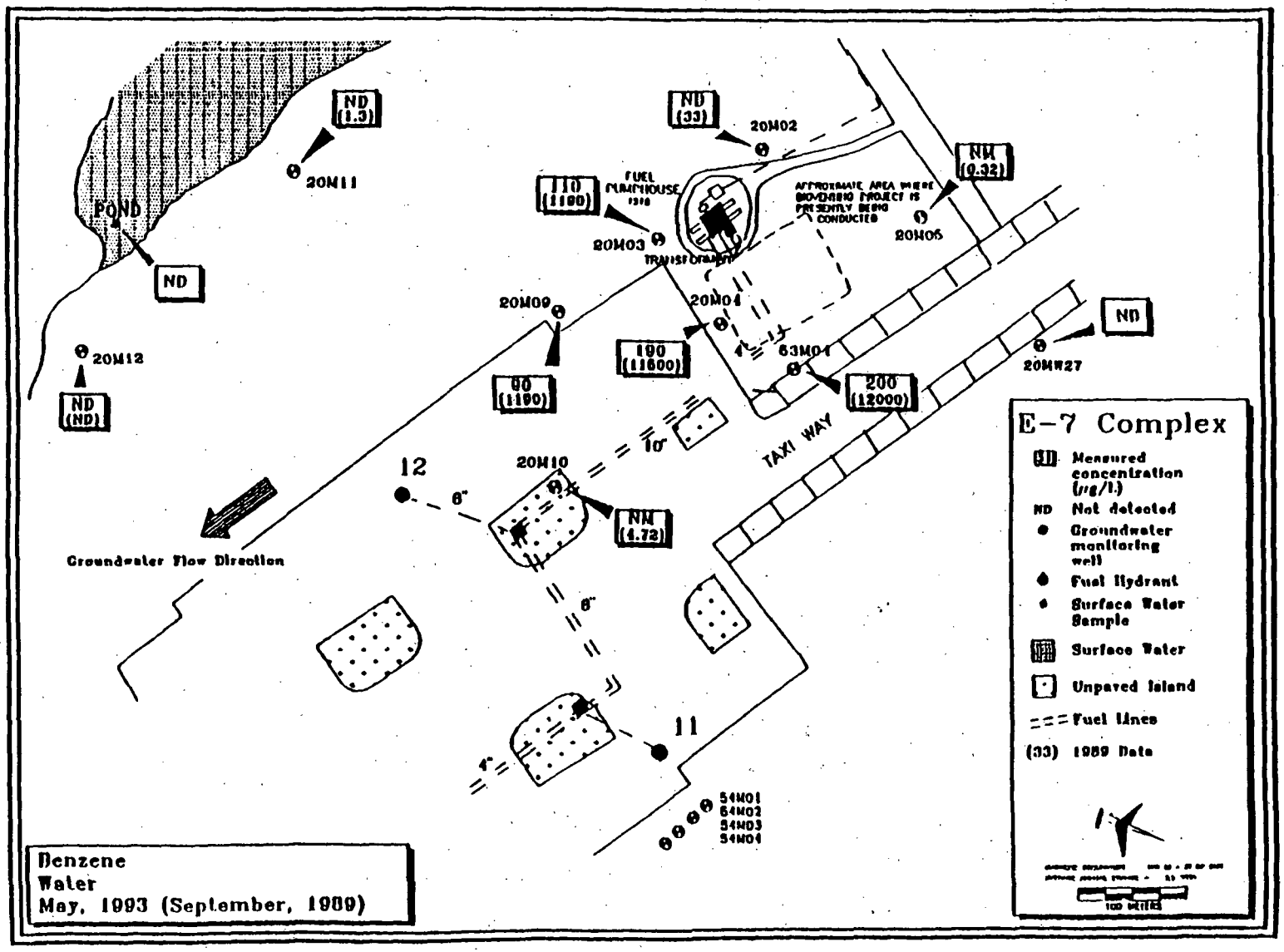


Figure 5.1 Benzene Concentrations in Groundwater, ST20 E-7 Complex

5.1.5 Soil Contamination at the E-8 Complex

During the 1988 study, TPH was detected at concentrations greater than 100 mg/kg in surface and subsurface soil samples from boring 20M06; BTEX compounds were also detected. In 1989, TPH concentrations greater than 100 mg/kg were detected in 1) surface and subsurface samples from a boring 40 m south of boring 20M06 and 2) subsurface (approximately 1 m depth) samples in a boring 30 m to the northeast of boring 20M06.

In both borings, TPH concentrations increase near the water table. This is probably a result of the original free phase liquid being smeared over an area near the top of the water table by water table fluctuations. This could have resulted in high soil TPH values in the area around well 20M06. BTEX associated with floating product also are expected to be present in subsurface soils within the smear zone. No additional soil samples were collected during the May 1993 sampling.

5.1.6 Groundwater Contamination at the E-8 Complex

The extent of benzene contamination in groundwater is defined by groundwater probe and monitoring well data collected in 1989 and 1993. The highest concentrations of benzene have historically been in well 20M06, which is near the fuel pump house (Figure 5.2). The 1993 levels in this well were 570 mg/L. This level of concentration is similar to the 481 mg/L concentration in 1989. A comparison of data from 1989 and 1993 indicate that the benzene concentrations are stable and the benzene plume does not appear to be migrating with groundwater as would be anticipated. BTEX have not been detected in the downgradient wells 20M15 and 20M16.

Toluene, ethylbenzene, and xylenes were detected in groundwater; the highest concentrations occurred in well 20M06. The MCLs for ethylbenzene and toluene were exceeded in the 1993 data set for well 20M06.

5.1.7 Floating Fuel at the E-8 Complex

No floating product was detected in any wells or product probes during May 1993. In 1989, product thickness measurements indicated floating product in five wells and product probes with thicknesses of up to 17.7 cm in well 20M06. No product was detected in this well in subsequent measurements in 1991 or 1993.

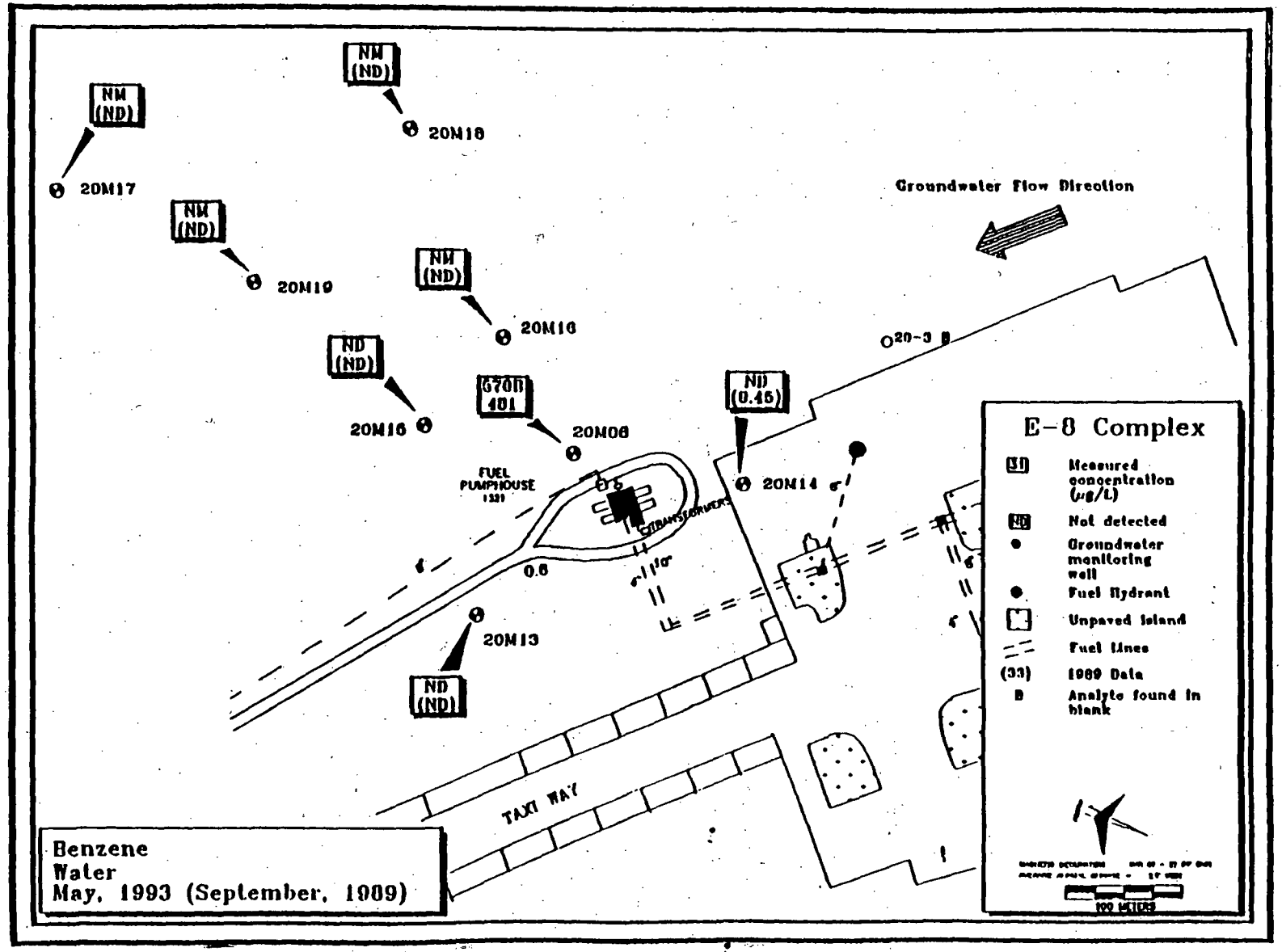


Figure 5.2 Benzene Concentrations in Groundwater, ST20 E-8 Complex

5.1.8 Source Area Hydrology at the E-8 Complex

Using the range of hydraulic conductivities (61.0 to 366 m/day) from aquifer tests on Eielson AFB, an effective porosity of 0.3, and gradients calculated from the water levels in wells, the mean groundwater velocity ranges from 0.16 to 0.99 m/day at an azimuth direction of 319.1°.

5.1.9 Soil Contamination at the E-9 Complex

TPH and BTEX were detected in subsurface soils within a 60-m radius of the pump house. The highest concentrations of TPH and volatile constituents of fuel detected in subsurface soil samples (1.5 to 2.0 m) in 1988 were located at well 20M01 (Figure 5.3). A number of subsurface soil samples were collected in 1989, in the vicinity of the pump house and the floating product plume. The TPH concentrations detected were above the 100 mg/kg Alaskan cleanup level. The extent of subsurface soil contamination east of well 20M07 (south and east of the pump house) has not been defined and is likely related to the floating product associated with releases from underground pipelines.

In addition to the petroleum-related contamination, vinyl chloride was detected in the soil at borehole 20M01. This may be an anomalous detection. Vinyl chloride was detected in only one of 16 soil samples, and no identified source for the vinyl chloride exists. The complex will continue to be monitored for vinyl chloride to determine if this result is representative.

5.1.10 Groundwater Contamination at the E-9 Complex

The source of BTEX and naphthalenes in groundwater is thought to be associated with floating product. The highest concentrations of BTEX and naphthalenes were measured in 1989. The concentrations of these contaminants were substantially lower in 1993.

The benzene plume in 1989 extended up to 180 m downgradient of the E-9 pump house (see Figure 5.4). The area of highest benzene concentration was near well 20M07 where floating product has been found. Also in 1989, low concentrations of BTEX were detected downgradient of well 20M23. In 1993, the concentrations and extent of the plume were substantially smaller. Benzene concentrations in well 20M07--near the floating product--has decreased from 440 mg/L in 1989 to 98.4 mg/L in 1993. Also, the benzene concentrations in wells 20M22, 20M23, and 20M24--wells downgradient of the E-9 pump house--have fallen below the MCL of 5 mg/L. The only increase in concentration was in well 20M08 (from 98.4 to 440 mg/L). In general, the benzene plume and concentrations in groundwater do not appear to be moving between 1989 and 1993 and in general are decreasing. The benzene in the groundwater is concentrated around the pump house, and an order of magnitude drop in concentration occurs on the other side of the runway (between wells 20M08 and 20M23).

5.1.11 Floating Fuel at the E-9 Complex

The fluctuating water table and variable soil lithologies result in continuous changes in apparent product thickness. Multiple leaks in underground fueling and defueling lines and

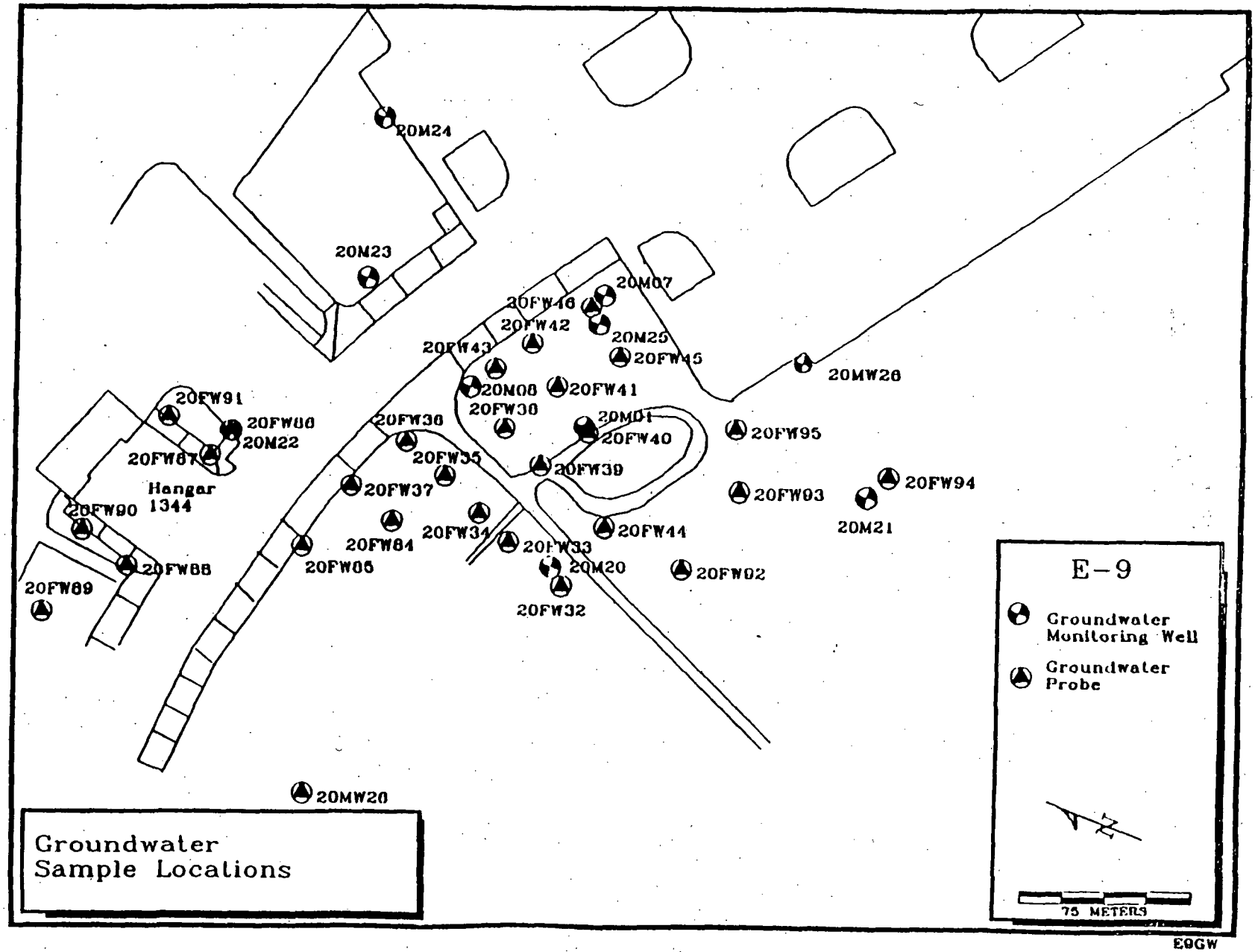


FIGURE 5.3 Groundwater Well and Probe Location, ST20 E-9 Complex

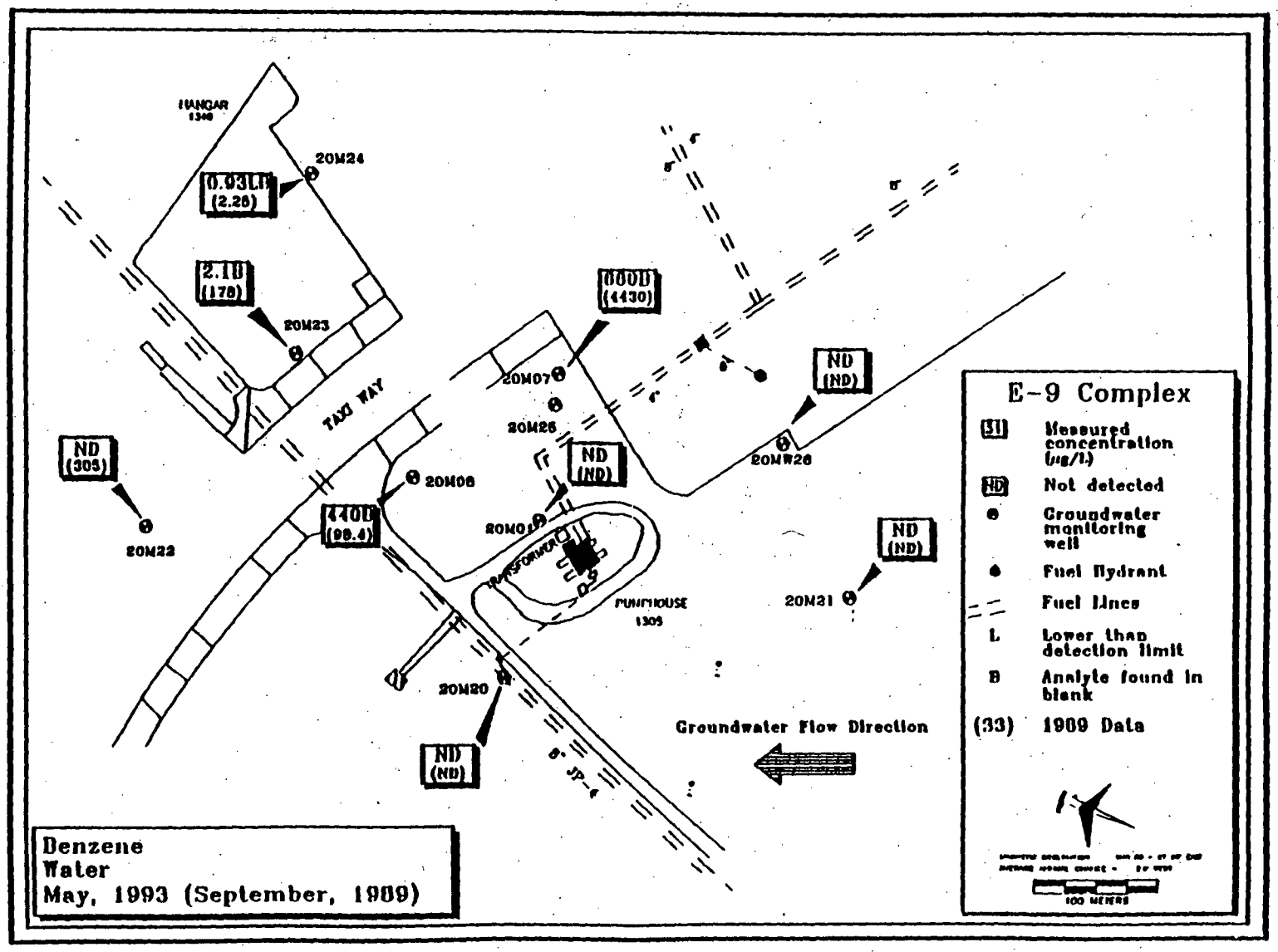


Figure 5.4 Benzene Concentrations in Groundwater, ST20 E-9 Complex

ongoing remediation efforts also affect the vertical and horizontal distribution of floating product. Thus, the data show no clear trends in measured product thickness. For instance, at product probe 20PP72 measurements taken 9 days apart in August 1992 varied by as much as 5.8 cm. One measurement of note during the 1993 sampling was product probe 20PP119 in which 98.15 cm of product were measured. This probe is adjacent to one of the underground fuel storage tanks.

The source of the floating product at the E-9 Complex is believed to be subsurface leaks from JP-4 fuel pipelines and tanks. The known extent of the floating product is near the pump house at the edge of the runway. Because of the site access restrictions along the runway, however, the floating product may extend out under the tarmac. Jet fuel seeping from the tarmac during pipe integrity testing, the high concentrations of BTEX detected in recent soil gas surveys on the tarmac, and the shape of the benzene isoconcentration lines suggest at least one source emanating from the tarmac.

5.1.12 Source Area Hydrology at the E-9 Complex

Using the range of hydraulic conductivities established for the main base (61.0 to 366 m/day), an effective porosity of 0.3, and gradients calculated from the water levels in wells, the mean groundwater velocity ranges from 0.20 to 1.23 m/day at an azimuth direction of 330.7°.

5.2 Source Area ST48 Power Plant Area

ST48 is located in the east-central portion of Eielson AFB, near the intersection of Division Street and Industrial Drive (see Figure 5.5). The source area is adjacent to a coal-generated power plant, an ash storage house, active railroad lines, and abandoned belowgrade fuel lines. The abandoned gasoline and diesel fuel lines reportedly served as delivery lines from bulk storage tanks to a military service station located at the intersection of Division Street and Wabash Avenue. The suspected source of hydrocarbon contamination is leakage from the POL lines where they pass beneath Industrial Drive. The pipelines were drained and purged when they were taken out of service at the fuel station. Primary contaminants of concern associated with the fuel leakage include BTEX, polycyclic aromatic hydrocarbons (PAHs), and TPHs. Soil and groundwater analytical data for ST 48 is presented in the Appendix.

Groundwater wells in the area include two cooling water supply wells and the main base drinking water supply well (well D).

Interim Actions

Interim remedial actions were implemented in 1992 and included installing a vacuum extraction system to remove floating product. The vacuum extraction system was unsuccessful. Two wells at the source area were subsequently retrofitted with blowers to "biovent" the area. Remediation system performance data were not available at the time this record of decision was prepared.

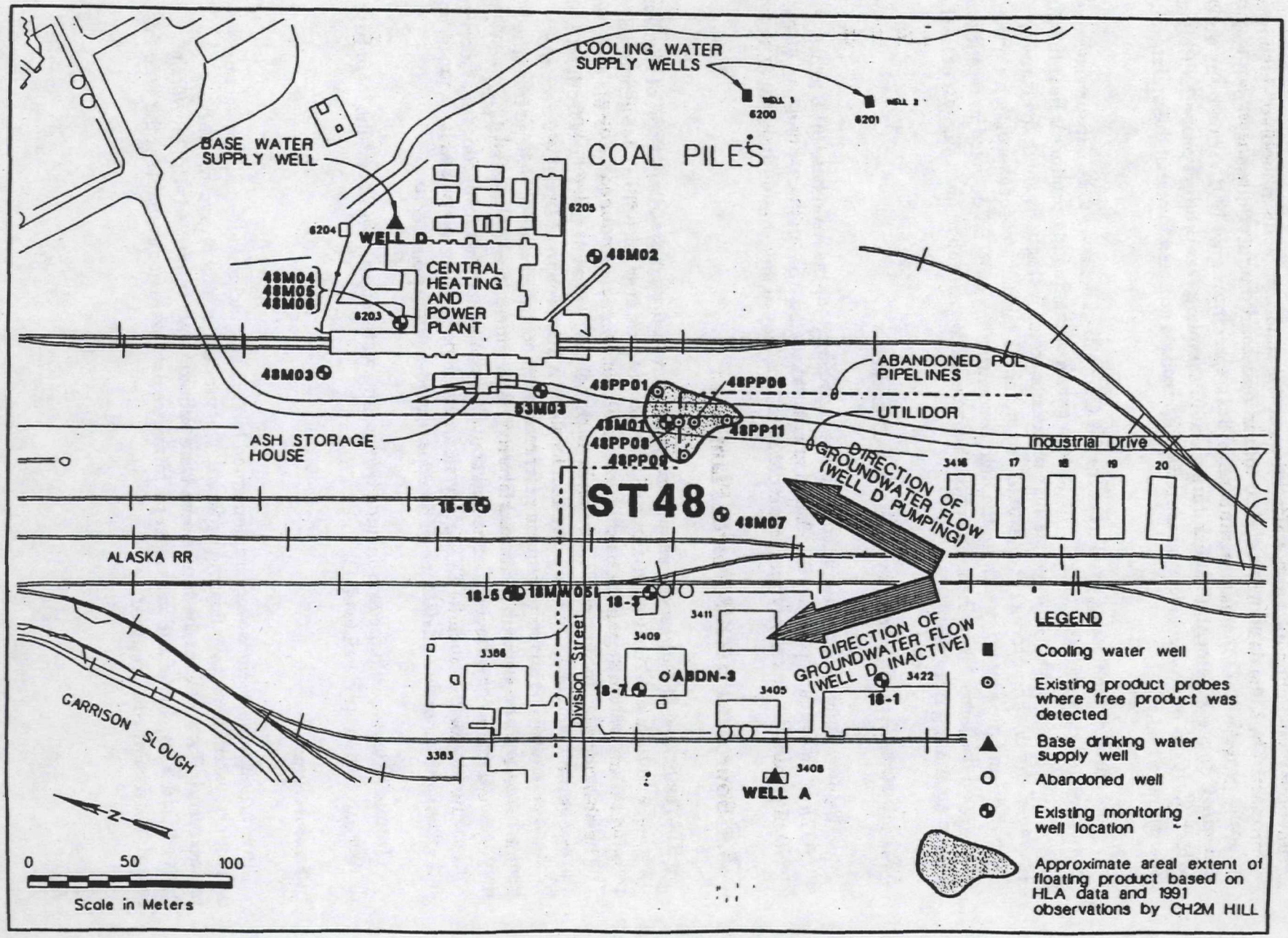


Figure 5.5 ST48 Floating Product

5.2.1 Soil Contamination at ST48

TPH above 100 mg/kg was identified in surface and subsurface soil from three areas in 1989. In 1993, TPH was not detected above the 100 mg/kg guideline; this was not sampled in the same locations as in 1989. However, TPH was detected in the new well 48M08 (4.9 mg/kg) and near the coal piles (11 mg/kg). The highest concentration of TPH (19,500 mg/kg) was measured at 4 to 4.4 m below land surface (bls) near the eastern edge of the free product area. Subsurface soils with TPH in excess of 100 mg/kg can be expected to cover an area near the free product in the smear zone. The maximum surface soil TPH concentration, 550 mg/kg, was observed in a soil boring adjacent to well 48M01.

In May 1993, soil samples from a soil boring near well 53M03 detected fuel-related PAHs in the soil at a depth confirming the PAH hits detected in well 53M03 during the 1989 sampling. In the soil boring adjacent to well 53M03 at 3.5 to 4 m bls, kerosene was detected at 380,000 mg/kg, and naphthalene was detected at 15,400 mg/kg. The 1989 data indicate that fuel-related PAHs were detected in a soil test pit excavated just east of the free product area, where 42,000 mg/kg of 2-methylnaphthalene and 21,000 mg/kg of naphthalene were detected at 4 to 4.4 m bls. The fuel-related PAHs are believed to be associated with the free product and are detected in soils within the smear zone of the water table.

5.2.2 Groundwater Contamination at ST48

A maximum benzene concentration of 7,100 mg/L (field laboratory screening value) was detected in 1989 from a groundwater probe west of well 53M03. The probe was located near the abandoned fuel line crossing beneath Division Street. A 1989 maximum benzene concentration of 1,390 mg/L was detected in groundwater from well 48M01, near the middle of the free product area. The concentration in this well dropped to 910 mg/L in 1993. The 1993 benzene plume extends from the free product area to the drinking water well. Detectable amounts of benzene (below 5 mg/L) have been reported in water supply well D in the past year. The water supply well appears to be creating a downward hydraulic gradient that is pulling the benzene down through the aquifer to the screened interval of the supply well (31.2 to 37.7 m). Ethylbenzene and toluene were detected in groundwater probes near the free product pool at concentrations exceeding their respective MCLs in 1989.

Fuel-related semivolatile organic compounds in groundwater are highest in well 48M01; in 1989, 140 mg/L of 2-methylnaphthalene and 270 mg/L of naphthalene were detected; in 1993, the values were 130 mg/L and 250 mg/L, respectively. Well 53M03 also had detectable amounts of naphthalene (150 mg/L) and 2-methylnaphthalene (80 mg/L). The fuel-related semivolatile organic compounds were detected only in the areas where floating product has been measured in the past.

The chlorinated solvents trans-dichloroethylene and tetrachloroethene were detected at ST48 in 1989 and 1993. The 1993 analytical results indicate the chlorinated solvents are present in low concentrations across ST48 with the highest concentrations (2.1 mg/L) in the upgradient well 48M07. The source of the solvents is believed to be from a dry well located in ST18 (OU2). The OU2 record of decision (PNL 1994) has confirmatory sampling scheduled for ST18.

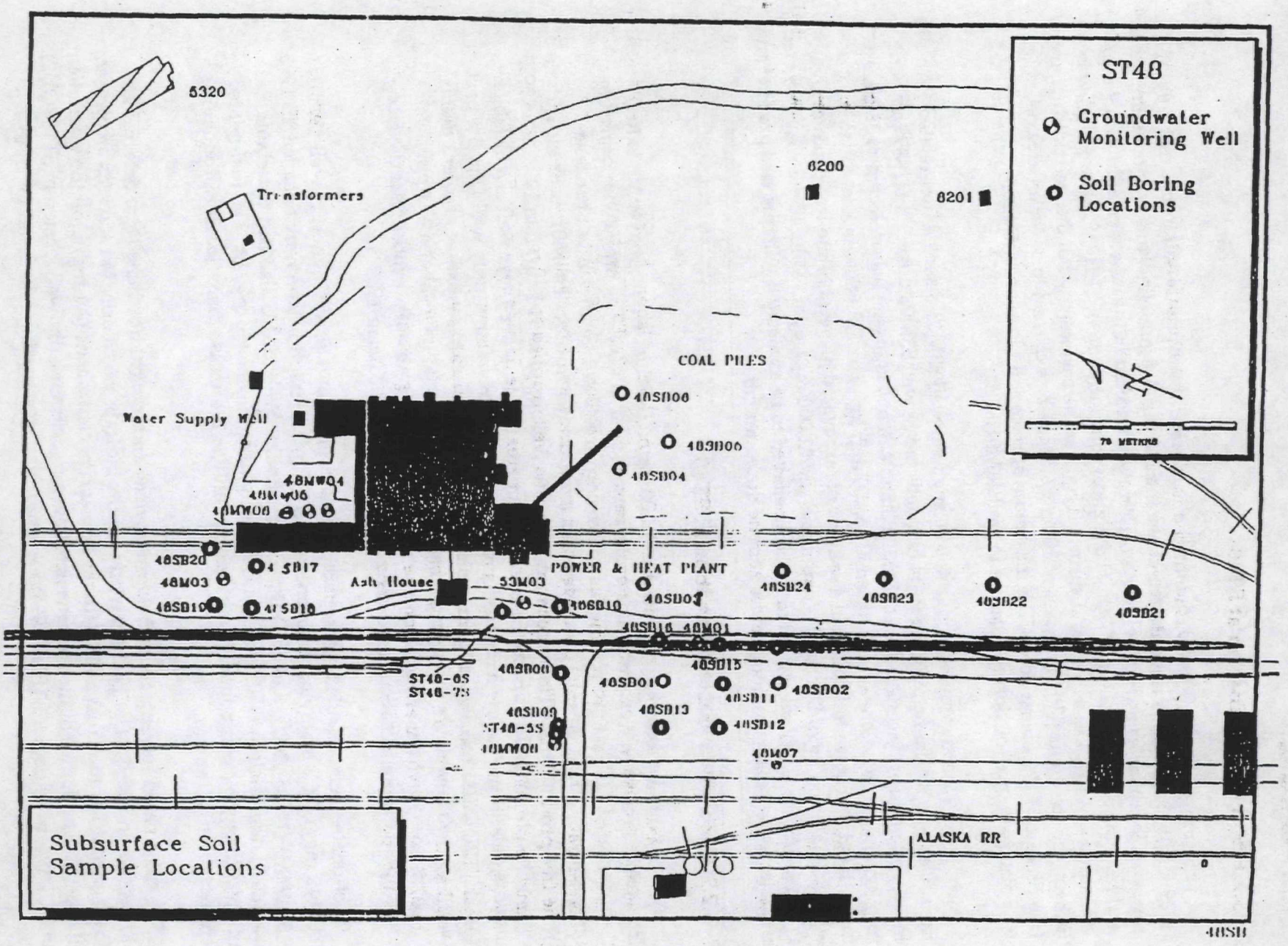


Figure 5.6 Groundwater Wells and Soil Boring Locations, ST48

5.2.3 Floating Fuel at ST48

Product thickness south of the Industrial Drive and Division Street intersection appears to have peaked during 1989 to 1991. The floating product level in product probe 48PP09 decreased from 46.0 cm in 1991 to 12.5 cm in 1993. Measured product thicknesses in well 48M01 also decreased from 24.4 cm in 1991 to 0.0 cm in 1993. Two other probes and one well (48PP13, 48PP67, and 48M03) in this same area showed no floating product in May 1993. However, floating product north of Industrial Drive and Division Street near the ash storage house appears to be increasing. Product probe 48PP28 had 43.6 cm of floating product and well 53M03 had 5.49 cm. Both of these measurements are the highest recorded at these locations. No floating product was detected in probe 48PP27, which is also near the ash storage house.

The source of the free product and associated BTEX and TPH contamination in subsurface soil and groundwater is thought to be the abandoned fuel lines near the intersection of Industrial Drive and Division Street. The lines may have leaked during operation and/or leaked residual fuel in the line after being abandoned. Thickness measurements of free product have historically been centered at two bends in the fuel line in the vicinity of the intersection of Industrial Drive and Division Street. The floating product near the ash storage house does not appear to have a pipe or tank source and no evidence of a surface spill in this area exists.

5.2.4 Source Area Hydrology at ST48

Groundwater flow is influenced by pumping from base supply well D (see Figure 5.5) and to a lesser extent by pumping from the two cooling water supply wells (wells 21 and 22) as evidenced by the skewed equi-potential lines on the local and regional water table maps. Well D, which is screened from 31- to 37.7-m bls, is pumped continuously at about 1,000 gal/min. Nearby water supply wells A and B are used when well D is undergoing repair or maintenance, and in the summer during periods of high water demand. Cooling supply wells 21 and 22 are used to supply cooling water to the power plant from about early June to late September. These wells are screened from 23.2- to 36.4-m bls and 25- to 38.1-m bls, respectively. These wells combined are capable of withdrawing approximately 4,200 gal/min.

There are a series of wells located within approximately 40 m of water supply well D that are completed at depths of 3.8 to 6.7 m (48M04), 11.4 to 14.5 m (48M05), and 27.1 to 30.2 m (48M06). May 1993 water levels indicated a downward hydraulic gradient while well D was operational. Water-level elevations in the shallow well (48M04) were as much as 0.21 m higher than in the deep well (48M06) in May 1993. Under natural conditions measured elsewhere on base, the hydraulic gradients are negligible.

Mean groundwater velocity was calculated to be 0.47 to 2.82 m/day in an azimuth direction of 33.3°. Note, the groundwater velocity extremes range from an azimuth direction of 326.5 to 104.7°. The variation is attributed to the pumping schedules of the pumping wells in the area.

5.3 Source Area ST49 Alert Hanger

ST49 is located just south of the main runway, in the southern portion of the base. The source area includes Building 1300 and the adjacent taxiway, which together comprise a deactivated combat alert hangar complex. Building 1300 has its own auxiliary electrical generator, septic system, and water supply. A utility room houses the generator and a 2,080-L aboveground day tank, which supplies diesel fuel for the generator. The aboveground tank is supplied by two 38,000-L underground fuel storage tanks located on the south end of the hangar. A 568 L/min base production well (well 7), serving the secondary main system, is located approximately 183 m east (hydraulically upgradient) of the source area. Soil and groundwater analytical data for ST49 is presented in the Appendix.

Interim Actions

The U.S. Air Force contracted installation of a 13-cm-diameter monitoring well adjacent to the utility room (well 49GMW). The well was later converted to a static recovery well to help remediate the floating product. The well was periodically pumped down by base personnel in 1989, and small quantities of product were recovered (HLA 1990).

The interim remedial action selected for ST49 in the OU1B Record of Decision (EPA 1992) was free product extraction. This action included installing five additional groundwater/product probes, and a 100-mm product recovery well. Three of the probes and the recovery well were installed on the north end of the hangar; the remaining two probes were installed next to the USTs on the south end of the hangar. No specific details of the recovery well operation and/or other remedial measures currently underway are available. Product recovered to date is approximately 95 liters.

In addition to the interim remedial actions at ST49, the U.S. Air Force conducted a tank integrity and pipeline leak detection investigation of USTs and associated transfer piping in May and June 1993. One of the two tanks failed the leak detection investigation and was removed from service. Both tanks will be removed and replaced under the Underground Storage Tank Program.

5.3.1 Soil Contamination at ST49

No BTEX were detected in soils from ST49 in 1989 or 1993. The 1993 sample locations included surface soil near well 49M05, near the inlet sump to Garrison Slough, in Garrison Slough, composite samples, and a soil boring near well 50M05 (Figure 5.7).

TPH was detected in small amounts near the inlet sump and in a soil boring near well 53M05 (7.6 to 11 mg/L) for diesel- and gasoline-ranged organic materials. These results do not confirm the maximum recorded TPH concentration of 263 mg/kg from well 53M05 in 1989. The maximum surface soil TPH concentration (1,100 mg/kg) was observed in 1989 in well boring 49M02 immediately below the asphalt cover.

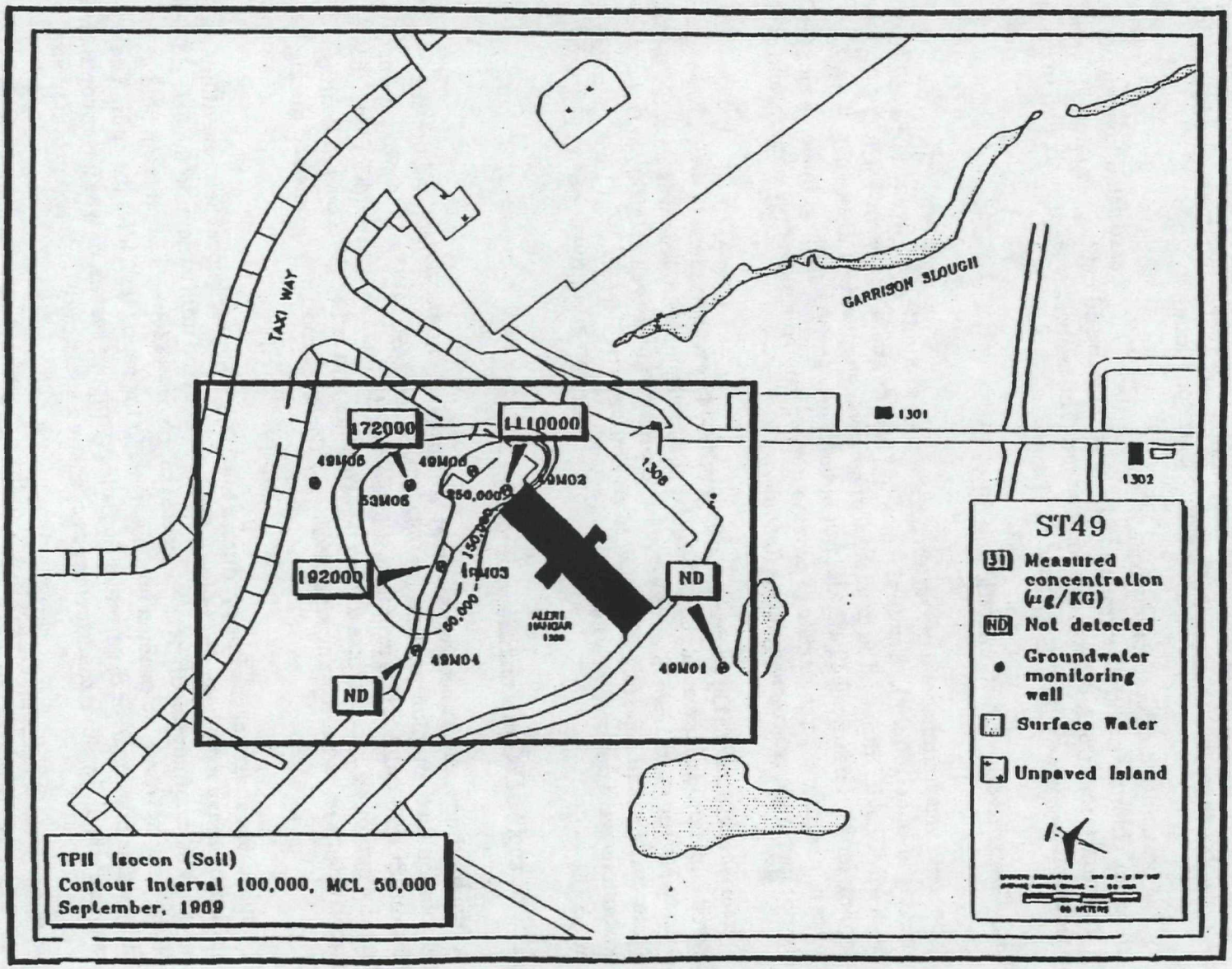


Figure 5.7 Total Petroleum Hydrocarbons from Soil Borings, 1989, ST49

Kerosene (63 mg/L) and naphthalene (130 mg/L) were detected in sediment samples from Garrison Slough at the outfall 400 m from the inlet sump at ST49. These samples also contained heavier PAHs. The source of the contamination could be transport of surface contamination from ST49 entering the inlet sump. The inlet sump drains the field to the north of the alert hanger and channels the water to Garrison Slough.

The pesticides dichlorodiphenyltrichloroethane (DDT) (and associated breakdown products), chlordane, and dieldrin, up to 2,100 mg/kg and 50 mg/kg respectively, were found in the surface soils upgradient of the source area. The pesticides were evaluated in the risk assessment and were within acceptable risk ranges.

5.3.2 Groundwater Contamination at ST49

Benzene was found above the screening levels in groundwater. Benzene exceeded the screening level of 0.6 mg/L in several wells, but was detected above the MCL of 5.0 mg/L only in well 49M02 at 8.2 mg/L. The low levels of benzene were widely disbursed. Surface sampling for TPH near well 49M05 did not indicate any surface spills in this area and no known underground piping exists to provide the source. Toluene, ethylbenzene, and xylene were not found above screening levels (0.6 mg/L).

Fuel-related semivolatile compounds in groundwater were highest in well 49M02, located within the free product area. Up to 117 mg/L of 2-methylnaphthalene was detected in 1988 and up to 140 mg/L in 1993. Kerosene was also present in the well at 2,800 mg/L in 1993. Trace amounts of kerosene (4.2 mg/L) were also present in well 49M06 in 1993. Petroleum hydrocarbons were detected at a maximum of 32.3 mg/L in groundwater from well 49M05 during 1989.

5.3.3 Floating Fuel Contamination at ST49

A free product area has been observed at the north end of the hangar and north of the utility room in three monitoring wells (49M02, 49M06, and 49GMW) and in two product probes. From 1988 to 1991, free product thickness has declined in well 49M02 from 0.655 to 0.19 m. Except for a slight increase during late summer and fall of 1992, overall floating product levels have been declining since 1988. No floating product was detected during May 1993.

The suspected source of the free product is the 2,080-L day tank located in the utility room. The spilled fuel may have been flushed to a floor drain in the utility room on the east side of the hangar. The drain reportedly was connected to the onsite septic system leach field at the time of the spill; however, no product was observed in the septic tank after the spill. The possibility exists that the floor drain either had a leaky piping system or was never connected to the septic system. In either case, fuel product entered subsurface soils and groundwater.

Two underground tanks on the south end of the hangar have also been considered as a potential source of the free product. The tanks were tested during June and July 1993. Product probes installed next to the tanks did not detect contamination. BTEX were detected by the soil gas survey in 1988 around the septic system drain field at the south end of the hangar but were

not detected around the free product. This finding may suggest that fuel-related compounds have been flushed to the septic system in the past via the hangar floor drain system. It also suggests that the diesel fuel has weathered, leaving little residual BTEX to migrate into surrounding soils or groundwater.

5.3.4 Source Area Hydrology at ST49

Groundwater velocity calculations used the range of hydraulic conductivities established for the main base (61.0 to 366 m/day), an effective porosity of 0.3, and gradients calculated from water table elevations to calculate a mean groundwater speed between 0.14 and 0.87 m/day at an azimuth direction of 355.9°.

5.4 Blair Lakes Target Facility (Source Areas SS50, SS51, SS52, SS53, and DP54)

Source areas SS50, SS51, SS52, SS53, and DP54 are located at the Blair Lakes Target Facility. A brief description of each source area is presented below.

SS50 Blair Lakes Vehicle Maintenance
Heating oil spill at storage tank and abandoned buried fuel lines.

SS51 Blair Lakes Ditch
A 1-cm-thick layer of diesel fuel found floating on water in a ditch excavated between generator building and fuel pump island. The source of the fuel leak is unknown.

SS52 Blair Lakes Diesel Spill
Diesel fuel spill (quantity unknown) from failure of 40-mm-diameter pipe connecting main diesel fuel storage tanks to 2,100-L aboveground day tanks near generator building.

SS53 Blair Lakes Fuel Spill
Unknown quantity of fuel spilled from fuel bladders that were placed in an area northeast of the tank farm approximately 18 m by 18 m.

DP54 Blair Lakes Drum Disposal Site
Reported drum disposal area. Existence of drums not substantiated.

The Blair Lakes Target Facility is an offbase facility located approximately 40 km southwest of Eielson AFB (see Figure 1.1 and Figure 4.2). The area is remote and can be reached in summer by helicopter or in winter by an ice bridge across the Tanana River. The area includes a vehicle maintenance shop, aboveground diesel and gasoline (MoGas) tank farm (and associated product delivery lines), generators, and storage outbuildings on a central gravel pad area. Aircraft target ranges, heliports, and drum disposal areas are located outside the gravel pad area. The original Blair Lakes water supply well, located in the southeast corner of the vehicle maintenance building, was taken out of service after a strong petroleum taste and odor were detected. The well casing is split near the surface, which may have provided a pathway

for surface contamination to enter the well. Potable water for the facility is now supplied by a new water supply well located hydraulically upgradient (south) of the central facility area.

Soil and groundwater analytical data for the Blair Lakes Target Facility is presented in the Appendix.

Interim Actions for Blair Lakes Target Facility

Remediation efforts consisting of three product recovery wells and two extraction trenches were implemented in 1992. As of April 1993, approximately 927 L of product had been recovered.

Source Areas SS53 and DP54

Little or no contamination was detected at SS53 and DP54. SS53 was listed as a source area as a result of a report of a fuel bladder breaking on the surface. Subsequent sampling in the area of the accident has only detected petroleum in levels below regulatory guidelines. This area is extensively reworked as a result of range operation, and contamination is believed to have volatilized and/or biodegraded. DP54 is a reported drum disposal area. An extensive search using ground-penetrating radar and resistivity surveys was unable to locate any buried drums. In addition, no contaminants could be found as a result of soil and groundwater sampling around the suspected area. It is believed that this reported drum disposal site does not exist.

5.4.1 Soil Contamination for Blair Lakes Target Facility

BTEX were detected in soil samples from most of the soil borings drilled in 1988, with highest concentrations reported at depths near the water table. Benzene concentrations were highest in the vicinity of the fuel pump island, while ethylbenzene, toluene, and total xylenes were highest in the vicinity of the vehicle maintenance building. The highest total BTEX concentration (approximately 1,900 mg/kg) was measured in soils from boring 50M01. See Figure 5.8 for monitoring well and soil boring locations. Fuel-related semivolatile compounds were detected in soil samples collected in the area of floating product and the fuel pump island. Concentrations of PAHs tended to increase with depth; compounds detected in the highest concentrations (2-methylnaphthalene and naphthalene) are some of the lighter, more soluble constituents associated with fuel products. Concentrations of TPH in surface soil exceeded 100 mg/kg around most of the tank farm perimeter, the fuel pump island, the southeast side of the vehicle maintenance area, and an isolated area near well 50M06. The maximum surface soil concentration was 3,350 mg/kg at a boring adjacent to well 50M01. Concentrations of TPH in subsurface soil exceed 100 mg/kg in the area between the western edge of the tank farm and the fuel pump island, and in the area of the free product. The maximum subsurface soil concentration was 91,800 mg/kg at boring 50M01 (1.4 to 1.8 m bls).

Fuel-related PAH contamination was detected in two of four soil samples analyzed for semivolatile compounds. These samples were collected from around the generator building where there have been numerous reports of leaking fuel lines. The sample collected between

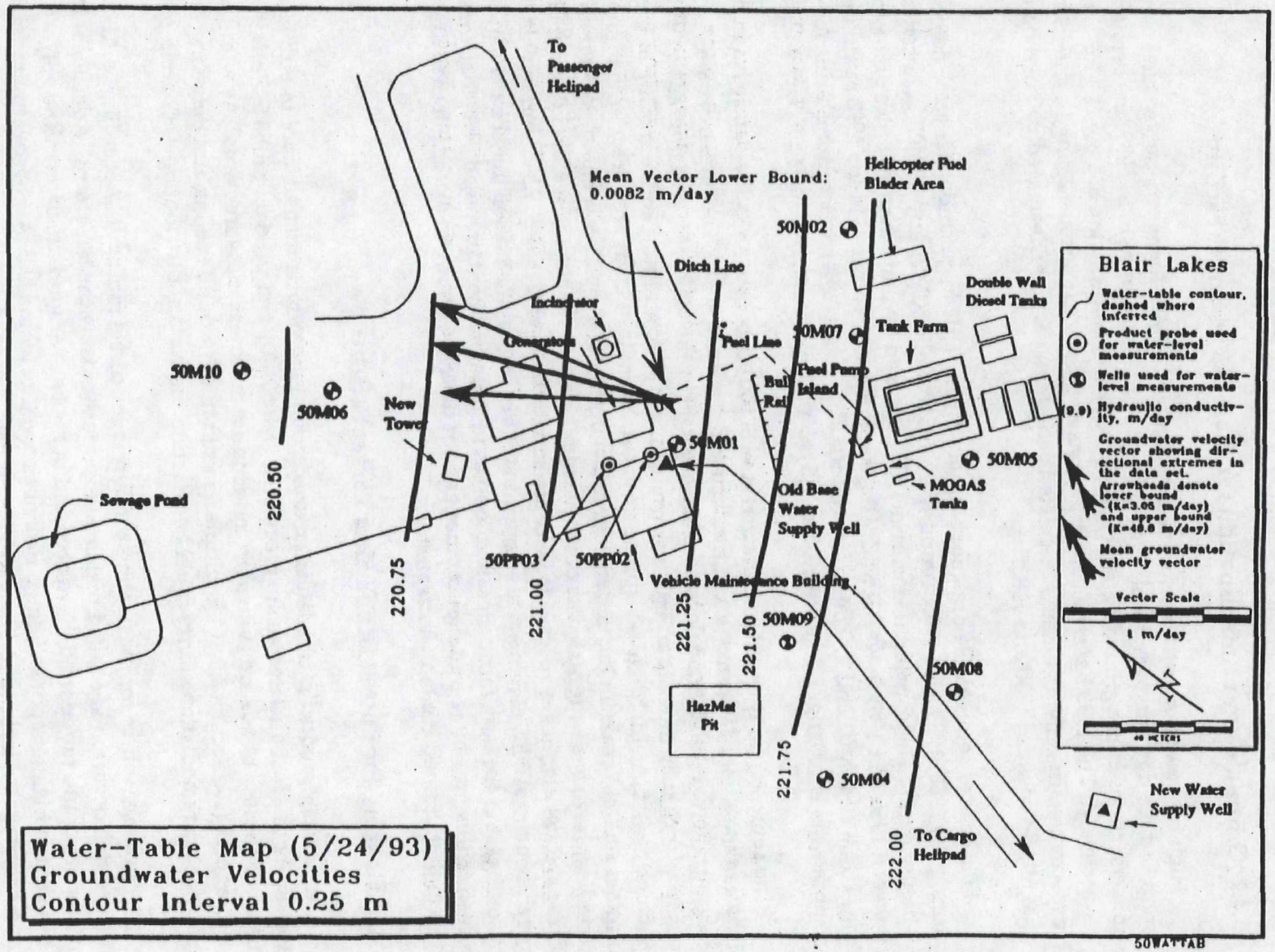


Figure 5.8 Water Table Map Blair Lakes Target Facility

the building and the diesel day tank had the highest concentrations of PAHs. Kerosene was detected at 910,000 mg/kg and naphthalene at 43,000 mg/kg.

5.4.2 Groundwater Contamination for Blair Lakes Target Facility

High benzene concentrations were found at well 50M01 (between the vehicle maintenance shop and the day tanks) and well 50M05 (west of the tank farms). In 1989, the benzene concentrations in the groundwater at wells 50M01 and 50M05 were 335 mg/L and 1,018 mg/L, respectively. The 1993 benzene concentrations at these locations are 28 mg/L and 290 mg/L, respectively. In general, all the fuel-related contaminants have decreased by nearly an order of magnitude between 1989 and 1993.

Fuel-related semivolatile organic compounds and TPH in groundwater were detected during the 1988, 1989, and 1993 sampling events in wells 50M01 and 50M05. Concentrations of 2-methylnaphthalene, naphthalene, and TPH increased by more than an order of magnitude between 1988 and 1989 in well 50M01. The naphthalene decreased in the 1993 sampling to 36 mg/L in well 50M01 and 190 mg/L in well 50M05. The risk-based screening value for naphthalene is 100 mg/L. In 1993, 2-methylnaphthalene was not detected in any wells.

The source(s) for the contamination at well 50M01 is believed to be past leaks in the lines between the diesel day tanks and the vehicle maintenance shop. The high benzene concentration at well 50M05 (located cross gradient of the tank farm and upgradient of the fuel pump island) may indicate an unknown source. Periodic scraping and regrading of the main pad and tank farm fill has likely spread any surface spills over an area broader than the original spill(s). Leaks in the underground fuel piping at the pump island or leaks in the tank farm liner have been suggested as other potential sources for subsurface TPH contamination. These sources also are suspected to be contributing to the elevated BTEX found in well 50M05 groundwater. ADEC records also suggest that TPH-contaminated soil may be present up to 30 m southeast of the tank farm. Possible sources include fuel-contaminated soils that were spread to this area by regrading activities and/or discharge from an existing french drain system that drained the tank farm area.

5.4.3 Floating Product at Blair Lakes Target Facility

The floating product is isolated to an area around the vehicle maintenance buildings and historically product thicknesses are greatest in well 50M01 and product probe 50PP03. Within this area, no clear trends are evident in the product thickness measurements. As with the ST20 E-9 Complex (see Section 5.1.10), multiple leaks in underground fueling and defueling lines and ongoing remediation efforts could be affecting the vertical distribution of floating product.

The primary source for the floating product is the diesel fuel spill. According to ADEC files, the spill occurred at a failed fuel line elbow just outside the tank farm. Additional leaks, both reported and unreported, have occurred in the lines around the day tank supplying fuel to the vehicle maintenance building. Recent excavation by the U.S. Air Force around the pump island has revealed leaking piping and TPH contamination.

5.4.4 Permafrost at Blair Lakes Target Facility

Permafrost across the Blair Lakes Target Facility varies in depth between 2 and 9 m. Permafrost was detected in two borings on the north end of the facility at a depth of approximately 7.6 m. On the south end of the facility, permafrost was detected at a depth of 9.2 m in the new water supply well and at 2.9 m in a soil test pit near well 50M02. A surface resistivity survey was performed to determine the depth to the top of permafrost in the vicinity of the developed area. The permafrost surface was identified by locating the boundary between the lower resistivity unfrozen topsoil, and the very highly resistive frozen soil beneath it (see Figure 5.9).

The results indicate that the permafrost depth varies significantly, sometimes abruptly, across the site and is closest to the surface on the east side of the building complex. However, many of the shallower models also showed a low resistivity layer under the upper frozen layer. Because these soundings were taken in May, this could indicate the upper high resistivity (frozen) layer is part of the active zone that seasonally freezes and thaws.

5.4.5 Source Area Hydrology at Blair Lakes Target Facility

Depth to groundwater generally ranges between 2.1 to 3 m below land surface. The elevation of the water table is significantly different between wells 50M08 (222.06 m mean sea level) and 50M01 (220.68 m mean sea level). This difference may be from the distribution of permafrost at the site causing local perched water conditions. Unconfined aquifer conditions are expected for the saturated alluvial deposits above the permafrost layer. Locally perched water conditions, however, can occur where the permafrost extends to near the land surface. Hydrographs indicate a spring recharge event that peaked during the first week in May 1993. The water levels do not appear to be influenced by the new water supply well. Well 50M05 is located within 70 m of the new water supply well. The new water supply well operates on a demand basis and is estimated to pump at approximately 24 gal/min, for a total of between 500 and 1,350 gal/day.

The permafrost also appears to act as a confining layer to the deeper alluvial aquifer from which the drinking water well is supplied. During an 8-hour constant discharge test in the old water supply well, no response was detected in a shallow observation well, 50M01, located 5.91 m from the stress well. A drawdown response of 0.03 m was predicted to occur within the first 2 hours of the test if the aquifer was unconfined.

Hydraulic conductivity values from six slug test in wells 50M02, 50M04, 50M06, 50M07, 50M08, and 50M10 range from 2.9 to 48.2 m/day (Table 5.13; Figure 5.8). Groundwater velocities range from 0.08 to 1.31 m/day with an azimuth direction of 339.2°.

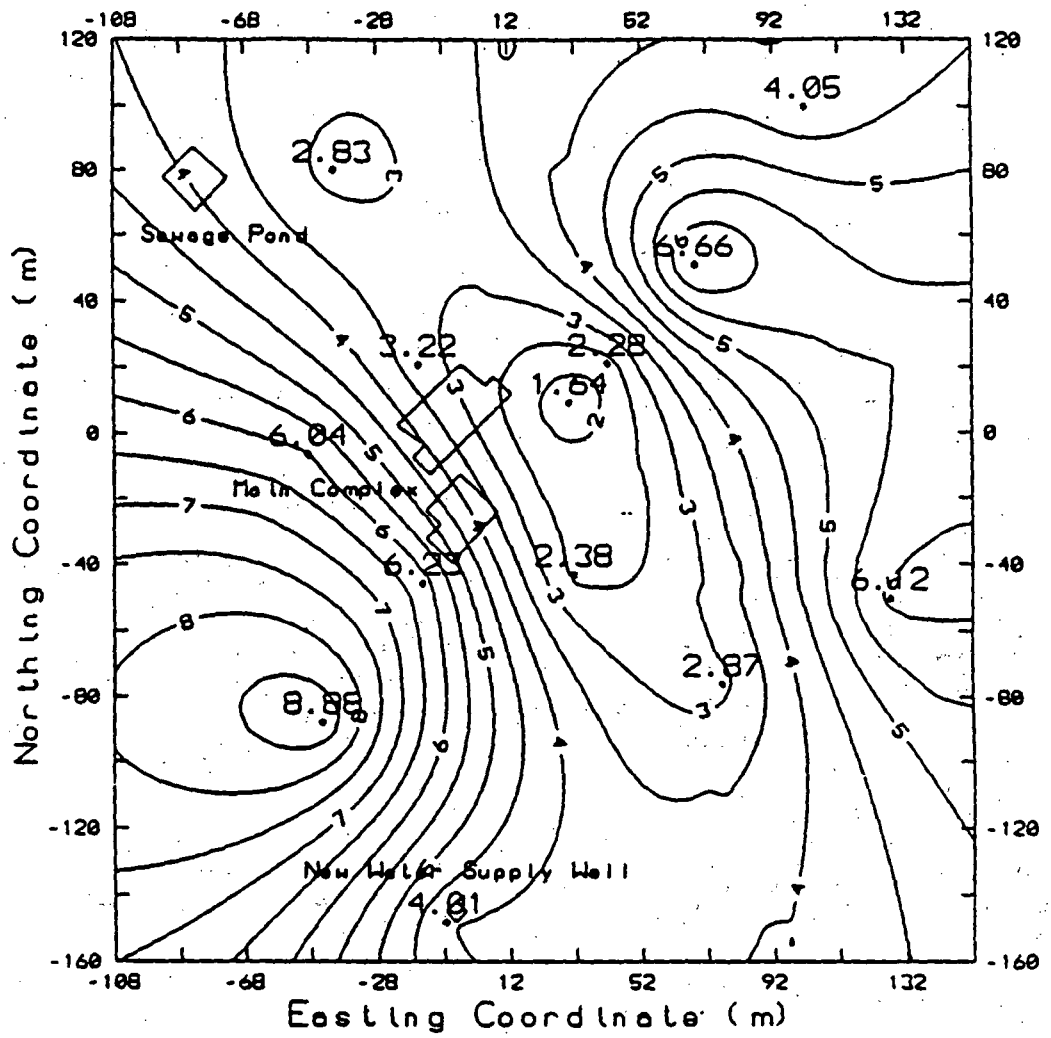


Figure 5.9 Top of Permafrost Subsurface, Blair Lakes Facility (in Meters Below the Ground Surface)

Table 5.7. Blair Lakes Target Facility Aquifer Test Summary

Well	Equivalent Hydraulic Conductivity (m/day)
50M02	9.3
50M04	2.9
50M06	48.2
50M07	4.1
50M08	9.9
50M10	20.0
Old water supply well	43.3

6.0 Summary of Site Risks

6.1 Human Health Risks

The baseline risk assessment (BLRA) (U.S. Air Force 1994b) provides the basis for taking action, indicates the exposure pathways that need to be addressed by the remedial actions, and indicates what risks could exist if no action were taken. This section of the record of decision reports the results of the BLRA conducted for the OU1 source areas.

As per guidance, all chemical analytes detected in the sampling programs that might contribute to the risk (excess cancer risk $>10^{-7}$ for soil, excess cancer risk $>10^{-6}$ for groundwater, or a hazard quotient of >0.1 in both media) at any source are a were carried through the risk quantification process (U.S. EPA 1991). Both a cancer risk and a hazard index were calculated for each OU1 source area for a variety of assumed exposure pathways and exposure parameters. Three land use scenarios were considered: current industrial, future industrial, and future residential. Each land use examines two source terms: an average exposure and a reasonable maximum exposure.

The exposure pathways considered for each source area and each exposure scenario are listed in in Table 6.1. Certain pathways for the three land uses were eliminated based on the following rationale:

Current Industrial

Because groundwater is not currently used, the exposure pathways associated with groundwater media were not evaluated further. These include ingestion of groundwater, dermal contact with contaminants during groundwater use, and inhalation of volatiles during groundwater use.

There is no accessible surface water in the vicinity of the OU1 site source areas. Therefore, the plausible pathways do not encompass ingestion of, or dermal exposure to, surface water, sediment or fish.

No grazing, gardening or agricultural use is made of the OU1 source areas; therefore, ingestion of plants grown in contaminated soils, or of animals fed on such plants, is not examined with the exception of ingestion of plants grown in contaminated soil as examined by the scenario for future residential land use.

Future Residential

Future residences are assumed to use groundwater as a potable water supply and to have garden plots. Some conceivable pathways do not warrant examination. Exposure to surface water and/or sediment is not plausible and was not considered in subsequent risk calculations. It was also assumed that future housing areas will not be used to graze livestock. Therefore, ingestion of animals fed on plants grown in contaminated soils was eliminated from further consideration.

Table 6.1 Summary of Human Exposure Pathways for all Source Areas

Theoretical Pathways	Current Land Use Industrial	Future Land Use Residential	Future Land Use Industrial
Ingestion of groundwater used as potable water supply	-[a]	X[b]	X
Dermal contact with contaminants during groundwater use	-	X	X
Inhalation of volatile contaminants during groundwater use	-	X	X
Incidental ingestion of surface water	-	-	-
Ingestion of fish	-	-	-
Incidental ingestion of surface soils	X	X	X
Ingestion of plants grown in contaminated soils	-	X	-
Ingestion of animals fed on plants grown in contaminated soils	-	-	-
Incidental ingestion of subsurface soils	X	X	X
Inhalation of volatile contaminants released from the soil into ambient air	X	X	X
Dermal contact with surface soils and dust	X	X	X
Dermal contact with subsurface soils	X	X	X
Inhalation of resuspended particulates	X	X	X
Dermal contact with surface water	-	-	-
Ingestion of sediments	-	-	-
Dermal contact with sediments	-	-	-

(a) - = Pathway eliminated; see text for elimination rationale.
(b) X = Pathway retained for quantitative risk evaluation.

Future Industrial

Industrial activities are assumed to be similar to current military activities. However, it is assumed that in the future, the area's groundwater plumes will be used as a potable supply. Therefore, three groundwater exposure scenarios were included.

Human exposure pathways for OU1 are discussed futher in section 6.1.2 *Exposure Assessment.*

6.1.1 Identification of Contaminants of Potential Concern

The concentrations of the detected analytes were screened to assess their toxicological significance. Contaminants of potential concern were identified based on the screening method suggested in the *Supplemental Guidance for Superfund Risk Assessments in Region 10* (EPA 1991). This method, called the "risk-based screening approach," compares the maximum concentration levels detected at each source area to a risk-based screening concentration. The criteria for the screening, as given in the Region 10 supplemental guidance, are as follows.

- List the maximum concentration of each chemical in each medium for each source area.
- Compare the maximum concentration to risk-based screening concentration.
- Eliminate the chemical if

-the maximum detection for water £10^{-6} cancer risk screening value and £0.1 Hazard Quotient (HQ) screening value and

-the maximum detection for soil £10^{-7} cancer risk screening value and £0.1 HQ screening value.

- Carry any chemicals not thus eliminated through the BLRA.

Each of the chemicals were reviewed in detail and some were further screened as follows.

Metals (such as arsenic, manganese, mercury, and chromium in addition to others) were statistically compared to background metals concentrations established for the base (U.S. Air Force 1993a, 1993b). Metals concentrations of less than background were not carried through the risk calculations.

Since no risk-based screening values are available for TPH, TPH was not carried through the risk calculations. The components of TPH (e.g., benzene, toluene, xylenes, naphthalenes) are, however, included in the risk calculations.

The BLRA used the data presented in Appendix A to calculate source terms and to quantify the potential human health risk associated with past Base industrial activities in the vicinity of OU1. The contaminants of potential concern for each source area were identified based on the screening method outlined above and are presented in Tables 6.2 through 6.19. Chemicals of concern are those chemicals not indicated as removed in the risk evaluation status column. The tables list the reasons for removal of chemicals from the risk calculations.

Tables 6.2 through 6.19 also present the exposure point concentrations for input into the risk calculations. The concentrations listed for each contaminant of concern are either the maximum value or the 95-percent upper confidence level on the mean concentration, whichever is smaller. Media sampled included groundwater, surface water, subsurface soils, and sediments.

6.1.2 Exposure Assessment

All OU1 source areas are either within industrial areas of the base or are in an undeveloped area (Blair Lakes). Based on this present land use, the risk assessment used a current industrial land-use exposure scenario. Therefore, a future industrial land-use exposure scenario was calculated for each source area. In these two land-use scenarios, the potentially exposed populations are current onsite workers. The current industrial scenario assumed that the current water supply system was used. The future industrial scenario assumed that water is provided by an untreated shallow groundwater well within OU1.

In addition, a future residential land-use exposure scenario was calculated for each source area. This scenario assumed that a small family farm, with adults and children, was located atop the source area. The water supply would be untreated groundwater from a well located within the source area.

Exposure pathways that are now or that could in the future become complete pathways were carried through the evaluation (see Section 6.1 and Table 6.1). Any exposure pathway that was determined to be incomplete or not applicable to a specific source area was eliminated from further evaluation.

The exposure factors used for the three land-use scenarios follow, in general, EPA Region 10 guidance (see Tables III-1a and III-1b in EPA 1991). Exposure factors for both average exposure and the more conservative reasonable maximum exposure cases were used. The factors used are listed in the tables in Appendix B of the baseline risk assessment (U.S. Air Force 1994b). The standard default exposure factors resulting from site-specific characteristics were not used. The exposure factors that do not adhere to the guidance are described in the following text.

The exposure duration for the average exposure scenario for industrial land is 9 years. This assessment assumed that this value should be equivalent to the average residence in a home (EPA 1991).

TABLE 6.2 Chemicals Detected in Surface Soil of ST20 E7: Their Concentrations and Their Risk Evaluation Status

Analyte Measured	CAS Number	Matrix Code(a)	Units	Average Value	Max. Value Detected	95% UCL(b)	Risk Evaluation Status and Reason for Removal from Further Consideration
4,4'-DDD	72-54-8	Soil	µg/kg	22.9	40	NA	Removed: Qualified and not detected.
4,4'-DDE	72-55-9	Soil	µg/kg	7	9	NA	Removed: Qualified and not detected.
4,4'-DDT	50-29-3	Soil	µg/kg	6	10	NA	Removed: Qualified and not detected.
Aluminum	7429-90-5	Soil	µg/kg	8.20E+06	8.20E+06	NA	Removed: Low toxicity.
Arsenic	7440-38-2	Soil	µg/kg	3600	3600	NA	Removed: Below natural background.
Barium	7440-39-3	Soil	µg/kg	73000	73000	NA	Removed: Maximum value below screening level.
Beryllium	7440-41-7	Soil	µg/kg	600	600	NA	
Calcium	7440-70-2	Soil	µg/kg	4.70E+06	4.70E+06	NA	Removed: Low toxicity.
Chromium	7440-47-3	Soil	µg/kg	16000	16000	NA	Removed: Below natural background.
Chrysene	218-01-9	Soil	µg/kg	210	210	NA	Removed: Qualified and not detected.
Cobalt	7440-48-4	Soil	µg/kg	6000	6000	NA	Removed: Maximum value below screening level.
Copper	7440-50-8	Soil	µg/kg	22000	22000	NA	Removed: Maximum value below screening level.
Fluoranthene	206-44-0	Soil	µg/kg	470	470	NA	Removed: Qualified and not detected.
Iron	7439-89-6	Soil	µg/kg	1.20E+07	1.20E+07	NA	Removed: Low toxicity.
Lead	7439-92-1	Soil	µg/kg	7700	7700	NA	Removed: Below natural background.
Magnesium	7439-95-4	Soil	µg/kg	3.90E+06	3.90E+06	NA	Removed: Low toxicity.
Manganese	7439-96-5	Soil	µg/kg	1.60E+05	1.60E+05	NA	Removed: Below natural background.
Mercury	7439-97-6	Soil	µg/kg	100	100	NA	Removed: Qualified and not detected.
Methylene Chloride	75-09-2	Soil	µg/kg	221.7	1100	1085	Removed: Maximum value below screening level.
Moisture	MOISTURE	Soil	PERCENT	15.3	23.6	NA	Removed: Physical soil parameter.
Nickel	7440-02-0	Soil	µg/kg	14000	14000	NA	Removed: Maximum value below screening level.
Potassium	7440-09-7	Soil	µg/kg	7.50E+05	7.50E+05	NA	Removed: Low toxicity.
Pyrene	129-00-0	Soil	µg/kg	380	380	NA	Removed: Qualified and not detected.
Sodium	7440-23-5	Soil	µg/kg	4.20E+05	4.20E+05	NA	Removed: Low toxicity.
TPH	TPH	Soil	µg/kg	10025	24800	NA	Removed: Maximum value below screening level.
Total Xylenes	1330-20-7	Soil	µg/kg	3.9	5.3	NA	Removed: Maximum value below screening level.
Vanadium	7440-62-2	Soil	µg/kg	29000	29000	NA	Removed: Maximum value below screening level.
Zinc	7440-66-6	Soil	µg/kg	39000	39000	NA	Removed: Maximum value below screening level.

(a) = "Water" represents groundwater beneath the site.
(b) = UCL represents Upper Confidence Limit (UCL = Mean + 2*std)

TABLE 6.3 Chemicals Detected in Subsurface Soils of ST20 E7: Their Concentrations and Their Risk Evaluation

Analyte Measured	CAS Number	Matrix Code(a)	Units	Average Value	Max. Value Detected	95% UCL(b)	Risk Evaluation Status and Reason for Removal from Further Consideration
2-Methylnaphthalene	91-57-6	Soil	µg/kg	40	40	NA	Removed: Maximum value below screening level.
Aluminum	7429-90-5	Soil	µg/kg	9.10E+06	9.10E+06	NA	Removed: Low toxicity.
Aroclor-1254	11097-69-1	Soil	µg/kg	60	70	NA	
Arsenic	7440-38-2	Soil	µg/kg	6300	6300	NA	Removed: Maximum value below screening level.
Barium	7440-39-3	Soil	µg/kg	88000	88000	NA	Removed: Maximum value below screening level.
Benzene	71-43-2	Soil	µg/kg	73.06	263	NA	Removed: Maximum value below screening level.
Beryllium	7440-41-7	Soil	µg/kg	150	150	NA	Removed: Qualified and not detected.
Cadmium	7440-43-9	Soil	µg/kg	490	490	NA	Removed: Qualified and not detected.
Calcium	7440-70-2	Soil	µg/kg	8.20E+06	8.20E+06	NA	Removed: Low toxicity.
Chromium	7440-47-3	Soil	µg/kg	19000	19000	NA	Removed: Below natural background.
Cobalt	7440-48-4	Soil	µg/kg	7000	7000	NA	Removed: Maximum value below screening level.
Copper	7440-50-8	Soil	µg/kg	20000	20000	NA	Removed: Maximum value below screening level.
Fluoranthene	206-44-0	Soil	µg/kg	293.3	330	NA	Removed: Qualified and not detected.
Iron	7439-89-6	Soil	µg/kg	1.70E+07	1.70E+07	NA	Removed: Low toxicity.
Lead	7439-92-1	Soil	µg/kg	4800	4800	NA	Removed: Below natural background.
Magnesium	7439-95-4	Soil	µg/kg	4.90E+06	4.90E+06	NA	Removed: Low toxicity.
Manganese	7439-96-5	Soil	µg/kg	3.10E+05	3.10E+05	NA	Removed: Below natural background.
Methylene Chloride	75-09-2	Soil	µg/kg	93.91	740	520.8	Removed: Maximum value below screening level.
Moisture	MOISTURE	Soil	PERCENT	15.56	25.9	NA	Removed: Soil parameter.
Nickel	7440-02-0	Soil	µg/kg	20000	20000	NA	Removed: Maximum value below screening level.
Potassium	7440-09-7	Soil	µg/kg	8.00E+05	8.00E+05	NA	Removed: Low toxicity.
Pyrene	129-00-0	Soil	µg/kg	283.3	330	NA	Removed: Qualified and not detected.
Sodium	7440-23-5	Soil	µg/kg	5.80E+05	5.80E+05	NA	Removed: Low toxicity.
TPH	TPH	Soil	µg/kg	11980	39500	NA	Removed: Maximum value below screening level.
Toluene	108-88-3	Soil	µg/kg	45.38	380	236.6	Removed: Maximum value below screening level.
Vanadium	7440-62-2	Soil	µg/kg	42000	42000	NA	Removed: Maximum value below screening level.
Zinc	7440-66-6	Soil	µg/kg	42000	42000	NA	Removed: Maximum value below screening level.

(a) = "Soil" represents Subsurface soils (beneath 2 feet).
(b) = UCL represents Upper Confidence Limit (UCL = Mean + 2*std)

TABLE 6.4 Chemicals Detected in Groundwater of ST20 E7: Their Concentrations and Their Risk Evaluation Status

Analyte Measured	CAS Number	Matrix Code(a)	Units	Average Value	Max. Value Detected	95% UCL(b)	Risk Evaluation Status and Reason for Removal from Further Consideration
1,1-Dichloroethylene	75-35-4	Water	µg/L	5.792	32	24.44	Removed: Qualified and not detected.
2,4-Dimethylphenol	105-67-9	Water	µg/L	7.084	30	28.96	
2-Methylnaphthalene	91-57-6	Water	µg/L	24.46	88.9	88.78	Removed: 95%UCL below screening level.
2-Methylphenol	95-48-7	Water	µg/L	42.2	300	407.7	
4-Methylphenol	106-44-5	Water	µg/L	26.6	180	140.8	
Acetophenone	98-86-2	Water	µg/L	36.33	99	NA	
Aluminum (Unfiltered)	7429-90-5	Water	µg/L	9100	25600	NA	Removed: Low toxicity .
Antimony (Filtered)	7440-36-0	Water	µg/L	103.5	110	NA	Removed: Unfiltered value used.
Antimony (Unfiltered)	7440-36-0	Water	µg/L	130	150	NA	Removed: Below natural background.
Arsenic (Filtered)	7440-38-2	Water	µg/L	22.6	50	NA	Removed: Below natural background.
Arsenic (Unfiltered)	7440-38-2	Water	µg/L	37.5	71	NA	Removed: Below natural background.
Barium (Filtered)	7440-39-3	Water	µg/L	183.3	200	NA	Removed: Unfiltered value used.
Barium (Unfiltered)	7440-39-3	Water	µg/L	323	579	NA	
Benzene	71-43-2	Water	µg/L	803.8	12000	5967	
Benzoic Acid	65-85-0	Water	µg/L	2.891	10.7	9.778	
Benzyl alcohol	100-51-6	Water	µg/L	0.41	2.78	NA	
Beryllium (Filtered)	7440-41-7	Water	µg/L	3.75	6	NA	Removed: Accidentally contaminated sample.
Bis(2-ethylhexyl) phthalate	117-81-7	Water	µg/L	13	15	NA	
Cadmium (Filtered)	7440-43-9	Water	µg/L	6.85	8.7	NA	Removed: Below natural background.
Calcium (Filtered)	7440-70-2	Water	µg/L	59867	68000	NA	Removed: Low toxicity .
Calcium (Unfiltered)	7440-70-2	Water	µg/L	64067	71000	NA	Removed: Low toxicity .
Chloride	CHLORIDE	Water	µg/L	209.2	755	744	Removed: Water quality parameter.
Chromium (Filtered)	7440-47-3	Water	µg/L	11	12	NA	Removed: Qualified and not detected.
Chromium (Unfiltered)	7440-47-3	Water	µg/L	22.57	40.7	NA	
Cobalt (Filtered)	7440-48-4	Water	µg/L	13.5	17	NA	Removed: Unfiltered value used.
Cobalt (Unfiltered)	7440-48-4	Water	µg/L	17.27	32.8	NA	Removed: Maximum value below screening level.
Copper (Filtered)	7440-50-8	Water	µg/L	10	10	10	Removed: Qualified and not detected.
Copper (Unfiltered)	7440-50-8	Water	µg/L	90.87	218	NA	
Ethylbenzene	100-41-4	Water	µg/L	88.6	1130	NA	
Iron (Filtered)	7439-89-6	Water	µg/L	7333	9200	NA	Removed: Low toxicity .
Iron (Unfiltered)	7439-89-6	Water	µg/L	33467	74400	NA	Removed: Low toxicity .
Kerosene	KEROSENE	Water	µg/L	3463	5000	NA	Removed: Qualified and not detected.
Lead (Unfiltered)	7439-92-1	Water	µg/L	7.25	12	NA	1993 value for well 53MO04 used
Magnesium (Filtered)	7439-95-4	Water	µg/L	13733	14000	NA	Removed: Low toxicity .
Magnesium (Unfiltered)	7439-95-4	Water	µg/L	17133	22400	NA	Removed: Low toxicity .
Manganese (Filtered)	7439-96-5	Water	µg/L	1543	2900	NA	Removed: Value below natural background.
Manganese (Unfiltered)	7439-96-5	Water	µg/L	1313	1800	NA	Removed: Value below natural background.
Mercury (Filtered)	7439-97-6	Water	µg/L	0.3	0.7	NA	
Mercury (Unfiltered)	7439-97-6	Water	µg/L	0.267	0.4	NA	Removed: Filtered value used.
Methylene Chloride	75-09-2	Water	µg/L	0.803	5	3.364	
Naphthalene	91-20-3	Water	µg/L	40.41	130	NA	
Nickel (Unfiltered)	7440-02-0	Water	µg/L	30.8	57.4	NA	Removed: Maximum value below screening level.

TABLE 6.4 Chemicals Detected in Groundwater of ST20 E7: Their Concentrations and Their Risk Evaluation Status

Analyte Measured	CAS Number	Matrix Code(a)	Units	Average Value	Max. Value Detected	95% UCL(b)	Risk Evaluation Status and Reason for Removal from Further Consideration
Nitrog,NO2+NO3	NO2+NO3	Water	µg/L	7	12	NA	Removed: Water quality parameter.
Petroleum Oil & Grease	OILGREASE	Water	µg/L	100	100	NA	Removed: Water quality parameter.
Phenol	108-95-2	Water	µg/L	41.21	170	NA	Removed: Maximum value below screening level.
Potassium (Filtered)	7440-09-7	Water	µg/L	2510	3000	NA	Removed: Low toxicity .
Potassium (Unfiltered)	7440-09-7	Water	µg/L	4147	7440	NA	Removed: Low toxicity .
Residue, DISS	RESIDUE	Water	µg/L	2.61E+05	3.12E+05	NA	Removed: Water quality parameter.
Silver (Filtered)	7440-22-4	Water	µg/L	7	10	NA	Removed: Maximum value below screening level.
Silver (Unfiltered)	7440-22-4	Water	µg/L	5.15	5.5	NA	Removed: Filtered value used.
Sodium (Filtered)	7440-23-5	Water	µg/L	4460	4580	NA	Removed: Low toxicity .
Sodium (Unfiltered)	7440-23-5	Water	µg/L	6107	8720	NA	Removed: Low toxicity .
Sulfate	SULFATE	Water	µg/L	1197	5930	5834	Removed: Water quality parameter.
TOC	TOC	Water	µg/L	8300	8300		Removed: Water quality parameter.
TPH	TPH	Water	µg/L	1141	7600	5753	Removed: Maximum value below screening level.
Toluene	108-88-3	Water	µg/L	1250	19700	9946	
Total Xylenes	1330-20-7	Water	µg/L	636.7	3830	3448	
Vanadium (Filtered)	7440-62-2	Water	µg/L	11.25	15	NA	Removed: Qualified and not detected.
Vanadium (Unfiltered)	7440-62-2	Water	µg/L	72.5	72.5	NA	
Vinyl Chloride	75-01-4	Water	µg/L	0.5	0.5	NA	Removed: Qualified and not detected.
Zinc (Filtered)	7440-66-6	Water	µg/L	16.67	40	NA	Removed: Maximum value below screening level.
Zinc (Unfiltered)	7440-66-6	Water	µg/L	85.33	191	NA	Removed: Maximum value below screening level.
m,p-Xylene	108-38-3	Water	µg/L	0.63	2	1.443	Removed: Value for total xylenes used.
oXylene	95-47-6	Water	µg/L	0.574	2	1.176	Removed: Value for total xylenes used.

(a) = "Water" represents groundwater beneath the site.

(b) = UCL represents Upper Confidence Limit (UCL = Mean + 2*std)

TABLE 6.5 Chemicals Detected in Surface Soils of ST20 E8: Their Concentrations and Their Risk Evaluation Status

Analyte Measured	CAS Number	Matrix Code(a)	Units	Average Value	Max. Value Detected	95% UCL(b)	Risk Evaluation Status and Reason for Removal from Further Consideration
Bis (2-ethylhexyl phthalate	117-81-7	Soil	µg/kg	48.75	120	NA	Removed: Maximum value below screening level.
Ethylbenzene	100-41-4	Soil	µg/kg	390	390	NA	Removed: Maximum value below screening level.
Methylene Chloride	75-09-2	Soil	µg/kg	290	290	NA	Removed: Maximum value below screening level.
Moisture	MOISTURE	Soil	Percent	14.98	22.7	NA	Removed: Physical soil parameter.
TPH	TPH	Soil	µg/kg	1.01E+05	8.88E+05	6.63E+05	Removed: Maximum value below screening level.
Toluene	108-88-3	Soil	µg/kg	728	3300	NA	Removed: Maximum value below screening level.
Total Xylenes	1330-20-7	Soil	µg/kg	2788	12400	NA	Removed: Maximum value below screening level.
(a) = "Soil" represents surface soils of site (less than 2 feet in depth).							
(b) = UCL represents Upper Confidence Limit (UCL = Mean + 2*std).							

TABLE 6.6 Chemicals Detected in Subsurface Soils of ST20 E8: Their Concentrations and Their Risk Evaluation Status

Analyte Measured	CAS Number	Matrix Code(a)	Units	Average Value	Max. Value Detected	95% UCL(b)	Risk Evaluation Status and Reason for Removal from Further Consideration
Acenaphthene	83-32-9	Soil	µg/kg	79.09	330	NA	Removed: Maximum value below screening level.
Acenaphthylene	208-96-8	Soil	µg/kg	73.64	330	327.3	Removed: Maximum value below screening level.
Anthracene	120-12-7	Soil	µg/kg	225.5	1700	1235	Removed: Maximum value below screening level.
Benzene	71-43-2	Soil	µg/kg	278.1	3310	2188	
Benzo(a)anthracene	56-55-3	Soil	µg/kg	141.8	630	585.9	
Benzo(a)pyrene	50-32-8	Soil	µg/kg	700	700	NA	
Benzo(b)fluoranthene	205-99-2	Soil	µg/kg	158.2	720	618.6	
Benzo(ghi)perylene	191-24-2	Soil	µg/kg	129.1	520	458.5	Removed: Maximum value below screening level.
Benzo(k)fluoranthene	207-08-9	Soil	µg/kg	137.3	510	497.1	
Bis (2-ethylhexyl phthalate	117-81-7	Soil	µg/kg	73.33	320	268.1	Removed: Maximum value below screening level.
Chrysene	218-01-9	Soil	µg/kg	203.6	1100	907.9	
Dibenz(a,h)anthracene	53-70-3	Soil	µg/kg	51.11	140	117.8	
Dibenzofuran	132-64-9	Soil	µg/kg	78.18	330	NA	Removed: Maximum value below screening level.
Ethylbenzene	100-41-4	Soil	µg/kg	735.6	8800	5815	Removed: Maximum value below screening level.
Fluoranthene	206-44-0	Soil	µg/kg	313.6	1700	1515	Removed: Maximum value below screening level.
Fluorene	86-73-7	Soil	µg/kg	80.91	330	NA	Removed: Maximum value below screening level.
Indeno(1,2,3-cd)pyrene	193-39-5	Soil	µg/kg	137.3	600	507.1	
Moisture	MOISTURE	Soil	Percent	10.32	22.5	NA	Removed: Physical soil parameter.
Oil & Grease	OILGREASE	Soil	µg/kg	200	300	NA	Removed: Water quality parameter.
Phenanthrene	85-01-8	Soil	µg/kg	295.5	1700	1438	Removed: Maximum value below screening level.
Pyrene	129-00-0	Soil	µg/kg	295.5	1700	1438	Removed: Maximum value below screening level.
TPH	TPH	Soil	µg/kg	35921	2.83E+05	1.76E+05	Removed: Maximum value below screening level.
Toluene	108-88-3	Soil	µg/kg	11466	2.40E+05	1.16E+05	Removed: Maximum value below screening level.
Total Xylenes	1330-20-7	Soil	µg/kg	1030	6830	5108	Removed: Maximum value below screening level.

(a) = "Soil" represents subsurface soils of site (greater than 2 feet in depth).

(b) = UCL represents Upper Confidence Limit (UCL = Mean + 2*std)

TABLE 6.7 Chemicals Detected in Groundwater of ST20 E8: Their Concentrations and Their Risk Evaluation Status

Analyte Measured	CAS Number	Matrix Code(a)	Units	Average Value	Max. Value Detected	95% UCL(b)	Risk Evaluation Status and Reason for Removal from Further Consideration
2-Methylnaphthalene	91-57-6	Water	µg/L	6.994	39	33.24	
Aluminum (Unfiltered)	7429-90-5	Water	µg/L	182	300	NA	Removed: Low toxicity.
Antimony (Filtered)	7440-36-0	Water	µg/L	113.3	140	NA	Removed: Below natural background.
Antimony (Unfiltered)	7440-36-0	Water	µg/L	90.33	100	NA	Removed: Filtered value used.
Arsenic (Filtered)	7440-38-2	Water	µg/L	3.467	5.9	NA	Removed: Unfiltered value used.
Arsenic (Unfiltered)	7440-38-2	Water	µg/L	5.533	8.1	NA	
Barium (Filtered)	7440-39-3	Water	µg/L	70	90	NA	Removed: Unfiltered value used.
Barium (Unfiltered)	7440-39-3	Water	µg/L	100	150	NA	Removed: Below natural background.
Benzene	71-43-2	Water	µg/L	69.54	830	456.6	
Bis (2-ethylhexyl phthalate	117-81-7	Water	µg/L	0	0	NA	Removed: Not detected in 1993 sampling.
Bis(2-ethylhexyl) phthalate	117-81-7	Water	µg/L	5.533	6.6	NA	Removed: Duplication error in database.
Calcium (Filtered)	7440-70-2	Water	µg/L	49333	56000	NA	Removed: Low toxicity.
Calcium (Unfiltered)	7440-70-2	Water	µg/L	51333	59000	NA	Removed: Low toxicity.
Chlorobenzene	108-90-7	Water	µg/L	5.283	20	NA	
Chromium (Filtered)	7440-47-3	Water	µg/L	8.467	10	NA	Removed: Unfiltered value used.
Chromium (Unfiltered)	7440-47-3	Water	µg/L	9.867	14	NA	Removed: Below natural background.
Cobalt (Filtered)	7440-48-4	Water	µg/L	8.4	10	NA	Removed: Unfiltered value used.
Cobalt (Unfiltered)	7440-48-4	Water	µg/L	9.1	10	NA	Removed: Maximum value below screening level.
Copper (Filtered)	7440-50-8	Water	µg/L	7.633	10	NA	Removed: Maximum value below screening level.
Copper (Unfiltered)	7440-50-8	Water	µg/L	11.67	15	NA	Removed: Maximum value below screening level.
Ethylbenzene	100-41-4	Water	µg/L	24	431	185.4	
Iron (Filtered)	7439-89-6	Water	µg/L	1420	3700	NA	Removed: Low toxicity.
Iron (Unfiltered)	7439-89-6	Water	µg/L	2813	5300	NA	Removed: Low toxicity.
Lead (Filtered)	7439-92-1	Water	µg/L	2.5	3	NA	Removed: Unfiltered value used.
Lead (Unfiltered)	7439-92-1	Water	µg/L	4.2	8.6	NA	Removed: Below natural background.
Magnesium (Filtered)	7439-95-4	Water	µg/L	10367	11000	NA	Removed: Low toxicity.
Magnesium (Unfiltered)	7439-95-4	Water	µg/L	10600	11000	NA	Removed: Low toxicity.
Manganese (Filtered)	7439-96-5	Water	µg/L	1086	2300	NA	Removed: Value below natural background.
Manganese (Unfiltered)	7439-96-5	Water	µg/L	2140	3700	NA	Removed: Value below natural background.
Methylene Chloride	75-09-2	Water	µg/L	1.626	2.5	NA	
Naphthalene	91-20-3	Water	µg/L	5.204	25	21.84	
Petroleum Oil & Grease	OILGREASE	Water	µg/L	200	200	NA	Removed: Water quality parameter.
Phenol	108-95-2	Water	µg/L	3.138	6.6	NA	Removed: Maximum value below screening level.
Potassium (Filtered)	7440-09-7	Water	µg/L	2333	3000	NA	Removed: Low toxicity.
Potassium (Unfiltered)	7440-09-7	Water	µg/L	2667	3000	NA	Removed: Low toxicity.
Residue, DISS	RESIDUE	Water	µg/L	2.54E+05	2.54E+05	NA	Removed: Water quality parameter.
Sodium (Filtered)	7440-23-5	Water	µg/L	3500	3900	NA	Removed: Low toxicity.
Sodium (Unfiltered)	7440-23-5	Water	µg/L	3733	4500	NA	Removed: Low toxicity.
TOC	TOC	Water	µg/L	13000	13000	NA	Removed: Water quality parameter.
TPH	TPH	Water	µg/L	350	1400	NA	Removed: Maximum value below screening level.
Toluene	108-88-3	Water	µg/L	171	3040	1353	

TABLE 6.7 Chemicals Detected in Groundwater of ST20 E8: Their Concentrations and Their Risk Evaluation Status

Analyte Measured	CAS Number	Matrix Code(a)	Units	Average Value	Max. Value Detected	95% UCL(b)	Risk Evaluation Status and Reason for Removal from Further Consideration
Total Xylenes	1330-20-7	Water	µg/L	216.1	1550	1189	
Vanadium (Unfiltered)	7440-62-2	Water	µg/L	11.67	15	NA	Removed: Maximum value below screening level.
Vinyl Chloride	75-01-4	Water	µg/L	0.5	0.5	NA	Removed: Qualified and not detected.
Zinc (Filtered)	7440-66-6	Water	µg/L	4.7	5	NA	Removed: Maximum value below screening level.
Zinc (Unfiltered)	7440-66-6	Water	µg/L	14.93	20	NA	Removed: Maximum value below screening level.
m,p-Xylene	108-38-3	Water	µg/L	19.48	420	194.1	Removed: Total value for xylene used.
m-Cresol	108-39-4	Water	µg/L	4.6	5	NA	Removed: Maximum value below screening level.
oXylene	95-47-6	Water	µg/L	17.26	380	175.4	Removed: Total value for xylene used.
(a) = "Water" represents groundwater beneath the site.							
(b) = UCL represents Upper Confidence Limit (UCL = Mean + 2*std)							

TABLE 6.8 Chemicals Detected in Surface Soils of ST20 E9: Their Concentrations and Their Risk Evaluation Status

Analyte Measured	CAS Number	Matrix Code(a)	Units	Average Value	Max. Value Detected	95% UCL(b)	Risk Evaluation Status and Reason for Removal from Further Consideration
2-Methylnaphthalene	91-57-6	Soil	µg/kg	314.7	670	577	Removed: Maximum value below screening level.
4,4'-DDD	72-54-8	Soil	µg/kg	15.1	25	NA	Removed: Maximum value below screening level.
4,4'-DDE	72-55-9	Soil	µg/kg	7.3	9.6	NA	Removed: Maximum value below screening level.
4,4'-DDT	50-29-3	Soil	µg/kg	30	50	NA	Removed: Maximum value below screening level.
Acenaphthene	83-32-9	Soil	µg/kg	912.4	7500	4344	Removed: Maximum value below screening level.
Acenaphthylene	208-96-8	Soil	µg/kg	360.8	1300	861	Removed: Maximum value below screening level.
Aluminum	7429-90-5	Soil	µg/kg	9.60E+06	9.60E+06	NA	Removed: Low toxicity.
Anthracene	120-12-7	Soil	µg/kg	1473	13000	7489	Removed: Maximum value below screening level.
Antimony	7440-36-0	Soil	µg/kg	11000	11000	NA	Removed: Qualified and not detected.
Arsenic	7440-38-2	Soil	µg/kg	7200	7200	NA	Removed: Below natural background.
Barium	7440-39-3	Soil	µg/kg	1.00E+05	1.00E+05	NA	Removed: Maximum value below screening level.
Benzo(a)anthracene	56-55-3	Soil	µg/kg	470	1300	NA	
Benzo(a)pyrene	50-32-8	Soil	µg/kg	483	1300	NA	
Benzo(b)fluoranthene	205-99-2	Soil	µg/kg	460	1300	NA	
Benzo(ghi)perylene	191-24-2	Soil	µg/kg	90	700	NA	Removed: Maximum value below screening level.
Benzo(k)fluoranthene	207-08-9	Soil	µg/kg	485	1300	NA	
Beryllium	7440-41-7	Soil	µg/kg	180	180	NA	Removed: Qualified and not detected.
Bis (2-ethylhexyl phthalate	117-81-7	Soil	µg/kg	77.5	130	NA	Removed: Duplication error in database.
Bis(2-ethylhexyl) phthalate	117-81-7	Soil	µg/kg	300.9	330	NA	Removed: Maximum value below screening level.
Calcium	7440-70-2	Soil	µg/kg	4.80E+06	4.80E+06	NA	Removed: Low toxicity.
Chlordane	57-74-9	Soil	µg/kg	23	25	NA	Removed: Maximum value below screening level.
Chromium	7440-47-3	Soil	µg/kg	22000	22000	NA	Removed: Below natural background.
Chrysene	218-01-9	Soil	µg/kg	595	1600	NA	
Cobalt	7440-48-4	Soil	µg/kg	10000	10000	NA	Removed: Maximum value below screening level.
Copper	7440-50-8	Soil	µg/kg	28000	28000	NA	Removed: Maximum value below screening level.
Dibenz(a,h)anthracene	53-70-3	Soil	µg/kg	70	100	NA	
Dibenzofuran	132-64-9	Soil	µg/kg	726.3	5700	3300	Removed: Qualified and not detected.
Diethylphthalate	84-66-2	Soil	µg/kg	338.2	600	487.1	Removed: Maximum value below screening level.
Fluoranthene	206-44-0	Soil	µg/kg	8806	90000	50662	Removed: Maximum value below screening level.
Fluorene	86-73-7	Soil	µg/kg	1075	9300	5311	Removed: Maximum value below screening level.
Indeno(1,2,3-cd)pyrene	193-39-5	Soil	µg/kg	340	660	NA	
Iron	7439-89-6	Soil	µg/kg	2.00E+07	2.00E+07	NA	Removed: Low toxicity.
Lead	7439-92-1	Soil	µg/kg	6800	6800	NA	Removed: Below natural background.
Magnesium	7439-95-4	Soil	µg/kg	5.00E+06	5.00E+06	NA	Removed: Low toxicity.
Manganese	7439-96-5	Soil	µg/kg	3.50E+05	3.50E+05	NA	Removed: Below natural background.
Moisture	MOISTURE	Soil	PERCENT	9.5	13.7	NA	Removed: Soil parameter.
Naphthalene	91-20-3	Soil	µg/kg	321.1	790	622.4	Removed: Maximum value below screening level.
Nickel	7440-02-0	Soil	µg/kg	23000	23000	NA	Removed: Maximum value below screening level.
Phenanthrene	85-01-8	Soil	µg/kg	7778	81000	45393	Removed: Maximum value below screening level.
Potassium	7440-09-7	Soil	µg/kg	8.00E+05	8.00E+05	NA	Removed: Low toxicity.
Pyrene	129-00-0	Soil	µg/kg	7172	71000	40409	Removed: Maximum value below screening level.
Pyridine	110-86-1	Soil	µg/kg	318.2	370	NA	Removed: Maximum value below screening level.

TABLE 6.8 Chemicals Detected in Surface Soils of ST20 E9: Their Concentrations and Their Risk Evaluation Status

Analyte Measured	CAS Number	Matrix Code(a)	Units	Average Value	Max. Value Detected	95% UCL(b)	Risk Evaluation Status and Reason for Removal from Further Consideration
Sodium	7440-23-5	Soil	µg/kg	4.40E+05	4.40E+05	NA	Removed: Low toxicity.
TPH	TPH	Soil	µg/kg	5.66E+05	1.10E+07	5.48E+06	Removed: Maximum value below screening level.
Toluene	108-88-3	Soil	µg/kg	62.54	85	NA	Removed: Maximum value below screening level.
Vanadium	7440-62-2	Soil	µg/kg	39000	39000	NA	Removed: Maximum value below screening level.
Zinc	7440-66-6	Soil	µg/kg	47000	47000	NA	Removed: Maximum value below screening level.
(a) = "Soil" represents surface soils of site (less than 2 feet in depth).							
(b) = UCL represents Upper Confidence Limit (UCL = Mean + 2*std)							

TABLE 6.9 Chemicals Detected in Subsurface Soils of ST20 E9: Their Concentrations and Their Risk Evaluation Status

Analyte Measured	CAS Number	Matrix Code(a)	Units	Average Value	Max. Value Detected	95% UCL(b)	Risk Evaluation Status and Reason for Removal from Further Consideration
1,1,2,2-Tetrachloroethane	79-34-5	Soil	µg/kg	91	670	421.6	
2-Methylnaphthalene	91-57-6	Soil	µg/kg	376.1	2500	2047	Removed: Maximum value below screening level.
Acenaphthene	83-32-9	Soil	µg/kg	29.44	90	87.83	Removed: Maximum value below screening level.
Anthracene	120-12-7	Soil	µg/kg	53.33	170	NA	Removed: Maximum value below screening level.
Benzo(a)anthracene	56-55-3	Soil	µg/kg	280	1700	1380	
Benzo(a)pyrene	50-32-8	Soil	µg/kg	268.9	1500	1238	
Benzo(b)fluoranthene	205-99-2	Soil	µg/kg	255.6	1300	1113	
Benzo(ghi)perylene	191-24-2	Soil	µg/kg	176.7	1000	805.2	Removed: Maximum value below screening level.
Benzo(k)fluoranthene	207-08-9	Soil	µg/kg	205.6	1000	852.4	
Bis (2-ethylhexyl phthalate	117-81-7	Soil	µg/kg	65.56	310	252.2	Removed: Maximum value below screening level.
Chrysene	218-01-9	Soil	µg/kg	328.9	1900	1568	
Dibenzofuran	132-64-9	Soil	µg/kg	44.44	210	172.3	Removed: Maximum value below screening level.
Ethylbenzene	100-41-4	Soil	µg/kg	632.2	8700	4939	Removed: Maximum value below screening level.
Fluoranthene	206-44-0	Soil	µg/kg	811.1	4800	3989	Removed: Maximum value below screening level.
Fluorene	86-73-7	Soil	µg/kg	68.89	340	283.8	Removed: Maximum value below screening level.
Indeno(1,2,3-cd)pyrene	193-39-5	Soil	µg/kg	193.3	1100	887.4	
Moisture	MOISTURE	Soil	PERCENT	8.54	19.2	NA	Removed: Soil parameter.
Naphthalene	91-20-3	Soil	µg/kg	136.1	840	692.4	Removed: Maximum value below screening level.
Phenanthrene	85-01-8	Soil	µg/kg	678.9	3500	3094	Removed: Maximum value below screening level.
Pyrene	129-00-0	Soil	µg/kg	356.7	1800	1575	Removed: Maximum value below screening level.
TPH	TPH	Soil	µg/kg	2.50E+06	2.80E+07	1.75E+07	Removed: Maximum value below screening level.
Tetrachloroethene	79-01-6	Soil	µg/kg	577.8	8500	4804	Removed: Maximum value below screening level.
Toluene	108-88-3	Soil	µg/kg	673.4	10000	5648	Removed: Maximum value below screening level.
Total Xylenes	1330-20-7	Soil	µg/kg	7478	59800	44838	Removed: Maximum value below screening level.
Vinyl Chloride	75-01-4	Soil	µg/kg	946.3	13000	7380	

(a) = "Soil" represents subsurface soils of site (greater than 2 feet in depth).
(b) = UCL represents Upper Confidence Limit (UCL = Mean + 2*std).

TABLE 6.10 Chemicals Detected in Groundwater of ST20 E9: Their Concentrations and Their Risk Evaluation Status

Analyte Measured	CAS Number	Matrix Code(a)	Units	Average Value	Max. Value Detected	95% UCL(b)	Risk Evaluation Status and Reason for Removal from Further Consideration
2-Methylnaphthalene	91-57-6	Water	µg/L	34.11	260	183.7	Removed: Maximum value below screening level.
Aluminum (Filtered)	7429-90-5	Water	µg/L	98.83	150	NA	Removed: Low toxicity.
Aluminum (Unfiltered)	7429-90-5	Water	µg/L	262.2	700	NA	Removed: Low toxicity.
Anthracene	120-12-7	Water	µg/L	2.407	5.2	NA	Removed: Maximum value below screening level
Antimony (Filtered)	7440-36-0	Water	µg/L	111.2	150	NA	Removed: Below natural background.
Antimony (Unfiltered)	7440-36-0	Water	µg/L	106.7	130	NA	Removed: Filtered value used.
Arsenic (Filtered)	7440-38-2	Water	µg/L	8.183	13	NA	Removed: Value below natural background.
Arsenic (Unfiltered)	7440-38-2	Water	µg/L	16.08	33	NA	Removed: Value below natural background.
Barium (Filtered)	7440-39-3	Water	µg/L	181.7	260	NA	Removed: Unfiltered value used.
Barium (Unfiltered)	7440-39-3	Water	µg/L	200	270	NA	
Benzene	71-43-2	Water	µg/L	1360	25000	11547	
Beryllium (Filtered)	7440-41-7	Water	µg/L	1.6	2.1	2.09	Removed: Below natural background.
Beryllium (Unfiltered)	7440-41-7	Water	µg/L	1.402	1.5	NA	Removed: Filtered value used.
Bis (2-ethylhexyl phthalate	117-81-7	Water	µg/L	5.363	21	19.75	Removed: Duplication error in database.
Bis (2-ethylmexylphthalate)	BEMP	Water	µg/L	19.33	56	NA	Removed: Duplication error in database.
Bis(2-ethylhexyl) phthalate	117-81-7	Water	µg/L	160	160	NA	Removed: Accidentally contaminated sample.
Cadmium (Filtered)	7440-43-9	Water	µg/L	5	5	NA	Removed: Unfiltered value used.
Cadmium (Unfiltered)	7440-43-9	Water	µg/L	5.65	7.2	NA	Removed: Below natural background.
Calcium (Filtered)	7440-70-2	Water	µg/L	61000	95000	NA	Removed: Low toxicity.
Calcium (Unfiltered)	7440-70-2	Water	µg/L	64167	98000	NA	Removed: Low toxicity.
Chlorobenzene	108-90-7	Water	µg/L	6.348	48.1	36.49	
Chromium (Filtered)	7440-47-3	Water	µg/L	10.67	14	13.93	Removed: Below natural background.
Chromium (Unfiltered)	7440-47-3	Water	µg/L	9.783	12	NA	Removed: Filtered value used.
Cobalt (Filtered)	7440-48-4	Water	µg/L	6.767	10	NA	Removed: Unfiltered value used.
Cobalt (Unfiltered)	7440-48-4	Water	µg/L	8.5	10	NA	Removed: Maximum value below screening level.
Copper (Filtered)	7440-50-8	Water	µg/L	9.683	10	NA	Removed: Maximum value below screening level.
Dibenzofuran	132-64-9	Water	µg/L	2.847	10	8.472	Removed: Maximum value below screening level.
Ethylbenzene	100-41-4	Water	µg/L	109.1	1600	725.7	
Fluoranthene	206-44-0	Water	µg/L	3.576	20	13.25	
Fluorene	86-73-7	Water	µg/L	3.105	10	8.919	Removed: Maximum value below screening level.
Iron (Filtered)	7439-89-6	Water	µg/L	8800	18000	NA	Removed: Low toxicity.
Iron (Unfiltered)	7439-89-6	Water	µg/L	11033	18000	NA	Removed: Low toxicity.
Kerosene	8008-20-6	Water	µg/L	3364	5000	NA	Removed: Qualified and not detected.
Lead (Filtered)	7439-92-1	Water	µg/L	2.75	4	3.975	Removed: Below natural background.
Lead (Unfiltered)	7439-92-1	Water	µg/L	2.083	2.5	NA	Removed: Filtered value used.
Magnesium (Filtered)	7439-95-4	Water	µg/L	13483	20000	NA	Removed: Low toxicity.
Magnesium (Unfiltered)	7439-95-4	Water	µg/L	13717	21000	NA	Removed: Low toxicity.
Manganese (Filtered)	7439-96-5	Water	µg/L	1528	2800	NA	Removed: Below natural background.
Manganese (Unfiltered)	7439-96-5	Water	µg/L	1550	2400	NA	Removed: Filtered value used.
Methylene Chloride	75-09-2	Water	µg/L	1.705	2.5	NA	

TABLE 6.10 Chemicals Detected in Groundwater of ST20 E9: Their Concentrations and Their Risk Evaluation Status

Analyte Measured	CAS Number	Matrix Code(a)	Units	Average Value	Max. Value Detected	95% UCL(b)	Risk Evaluation Status and Reason for Removal from Further Consideration
Naphthalene	91-20-3	Water	µg/L	24.9	160	127.1	
Nickel (Filtered)	7440-02-0	Water	µg/L	16.33	23	22.87	Removed: Unfiltered value used.
Nickel (Unfiltered)	7440-02-0	Water	µg/L	16.5	24	23.85	Removed: Maximum value below screening level.
Nitrog.NO2 + NO3	NO2 + NO3	Water	µg/L	13.67	16	NA	Removed: Water quality parameter.
Phenanthrene	85-01-8	Water	µg/L	3.68	22	14.28	
Potassium (Filtered)	7440-09-7	Water	µg/L	4217	10000	NA	Removed: Low toxicity.
Potassium (Unfiltered)	7440-09-7	Water	µg/L	3850	10000	NA	Removed: Low toxicity.
Pyrene	129-00-0	Water	µg/L	3.235	15	10.81	Removed: 95% UCL below screeening level.
Residue, DISS	RESIDUE	Water	µg/L	2.80E + 05	3.22E + 05	NA	Removed: Water quality parameter.
Silver (Filtered)	7440-22-4	Water	µg/L	6.667	10	NA	Removed: Unfiltered value used.
Silver (Unfiltered)	7440-22-4	Water	µg/L	7.95	10	NA	Removed: Maximum value below screening level.
Sodium (Filtered)	7440-23-5	Water	µg/L	3950	4300	NA	Removed: Low toxicity.
Sodium (Unfiltered)	7440-23-5	Water	µg/L	3917	4400	NA	Removed: Low toxicity.
TPH	TPH	Water	µg/L	1836	13100	10186	
Tin (Filtered)	7440-31-5	Water	µg/L	52.5	65	64.75	Removed: Maximum value below screening level.
Tin (Unfiltered)	7440-31-5	Water	µg/L	50.5	53	52.95	Removed: Filtered value used.
Toluene	108-88-3	Water	µg/L	1233	21000	9746	
Total Xylenes	1330-20-7	Water	µg/L	240.4	2200	1426	Removed: Value for m,p xylene used.
Vanadium (Filtered)	7440-62-2	Water	µg/L	13.18	15	NA	Removed: Maximum value below screening level.
Vanadium (Unfiltered)	7440-62-2	Water	µg/L	12.08	15	NA	Removed: Filtered value used.
Vinyl Chloride	75-01-4	Water	µg/L	1	1	1	Removed: Qualified and not detected.
Zinc (Filtered)	7440-66-6	Water	µg/L	21.35	40	NA	Removed: Maximum value below screening level.
Zinc (Unfiltered)	7440-66-6	Water	µg/L	5.633	9.1	9.062	Removed: Filtered value used.
m,p-Xylene	108-38-3	Water	µg/L	489.3	4700	2723	
oXylene	95-47-6	Water	µg/L	184.8	1400	999	Removed: Value for m,p xylene used.

(a) = "Water" represents groundwater beneath the site.

(b) = UCL represents Upper Confidence Limit (UCL = Mean + 2*std).

TABLE 6.11 Chemicals Detected in Surface Soils of ST48: Their Concentrations and Their Risk Evaluation Status

Analyte Measured	CAS Number	Matrix Code(a)	Units	Average Value	Max. Value Detected	95% UCL(b)	Risk Evaluation Status and Reason for Removal from Further Consideration
4,4'-DDD	72-54-8	Soil	µg/kg	33.7	63	NA	Removed: Maximum value below screening level.
4,4'-DDE	72-55-9	Soil	µg/kg	26	47	NA	Removed: Maximum value below screening level.
4,4'-DDT	50-29-3	Soil	µg/kg	95	180	NA	
Aluminum	7429-90-5	Soil	µg/kg	1.10E+07	1.10E+07	NA	Removed: Low toxicity.
Anthracene	120-12-7	Soil	µg/kg	353.3	400	NA	Removed: Maximum value below screening level.
Arsenic	7440-38-2	Soil	µg/kg	4800	4800	NA	Removed: Below natural background.
Barium	7440-39-3	Soil	µg/kg	3.50E+05	3.50E+05	NA	Removed: Maximum value below screening level.
Benzo(a)anthracene	56-55-3	Soil	µg/kg	543.3	970	NA	
Benzo(a)pyrene	50-32-8	Soil	µg/kg	546.7	980	NA	
Benzo(b)fluoranthene	205-99-2	Soil	µg/kg	536.7	950	NA	
Benzo(ghi)perylene	191-24-2	Soil	µg/kg	400	540	NA	Removed: Maximum value below screening level.
Benzo(k)fluoranthene	207-08-9	Soil	µg/kg	510	870	NA	
Beryllium	7440-41-7	Soil	µg/kg	400	400	NA	
Bis(2-ethylhexyl) phthalate	117-81-7	Soil	µg/kg	440	660	NA	Removed: Maximum value below screening level.
Cadmium	7440-43-9	Soil	µg/kg	430	430	NA	Removed: Qualified and not detected.
Calcium	7440-70-2	Soil	µg/kg	1.10E+07	1.10E+07	NA	Removed: Low toxicity.
Chlordane	57-74-9	Soil	µg/kg	20	25	NA	Removed: Qualified and not detected.
Chromium	7440-47-3	Soil	µg/kg	19000	19000	NA	Removed: Below natural background.
Chrysene	218-01-9	Soil	µg/kg	586.7	1100	NA	
Cobalt	7440-48-4	Soil	µg/kg	7000	7000	NA	Removed: Maximum value below screening level.
Copper	7440-50-8	Soil	µg/kg	18000	18000	NA	Removed: Maximum value below screening level.
Fluoranthene	206-44-0	Soil	µg/kg	953.3	2200	NA	Removed: Maximum value below screening level.
Heptachlor	76-44-8	Soil	µg/kg	3	5	NA	Removed: Qualified and not detected.
Indeno(1,2,3-cd)pyrene	193-39-5	Soil	µg/kg	390	510	NA	Removed: Qualified and not detected.
Iron	7439-89-6	Soil	µg/kg	1.20E+07	1.20E+07	NA	Removed: Low toxicity.
Lead	7439-92-1	Soil	µg/kg	22250	23500	NA	
Magnesium	7439-95-4	Soil	µg/kg	3.60E+06	3.80E+06	NA	Removed: Low toxicity.
Manganese	7439-96-5	Soil	µg/kg	2.60E+05	2.60E+05	NA	Removed: Soil parameter.
Mercury	7439-97-6	Soil	µg/kg	100	100	NA	Removed: Maximum value below screening level.
Moisture	MOISTURE	Soil	PERCENT	6.867	12	NA	
Nickel	7440-02-0	Soil	µg/kg	17000	17000	NA	Removed: Maximum value below screening level.
Phenanthrene	85-01-8	Soil	µg/kg	542.5	1500	NA	Removed: Maximum value below screening level.
Potassium	7440-09-7	Soil	µg/kg	9.00E+05	9.00E+05	NA	Removed: Low toxicity.
Pyrene	129-00-0	Soil	µg/kg	886.7	2000	NA	Removed: Maximum value below screening level.
Sodium	7440-23-5	Soil	µg/kg	3.40E+05	3.40E+05	NA	Removed: Low toxicity.
TPH	TPH	Soil	µg/kg	1.11E+05	5.50E+05	4.33E+05	Removed: Maximum value below screening level.
TPH-diesel	TPH-diesel	Soil	µg/kg	6575	11000	NA	Removed: TPH value used.
Vanadium	7440-62-2	Soil	µg/kg	33000	33000	NA	Removed: Maximum value below screening level.
Zinc	7440-66-6	Soil	µg/kg	34000	34000	NA	Removed: Maximum value below screening level.

(a) = "Soil" represents surface soils of site (less than 2 feet depth).

(b) = UCL represents Upper Confidence Limit (UCL = Mean + 2*std)

TABLE 6.12 Chemicals Detected in Subsurface Soils of ST48: Their Concentrations and Their Risk Evaluation Status

Analyte Measured	CAS Number	Matrix Code(a)	Units	Average Value	Max. Value Detected	95% UCL(b)	Risk Evaluation Status and Reason for Removal from Further Consideration
2-Methylnaphthalene	91-57-6	Soil	µg/kg	5526	46000	35943	Removed: Maximum value below screening level.
Aluminum	7429-90-5	Soil	µg/kg	1.10E+07	1.10E+07	NA	Removed: Low toxicity.
Arsenic	7440-38-2	Soil	µg/kg	7400	7400	NA	
Barium	7440-39-3	Soil	µg/kg	1.30E+05	1.30E+05	NA	Removed: Maximum value below screening level.
Beryllium	7440-41-7	Soil	µg/kg	400	400	NA	Removed: Maximum value below screening level.
Bis (2-ethylhexyl)phthalate	117-81-7	Soil	µg/kg	241.7	1200	1181	Removed: Maximum value below screening level.
Bis(2-ethylhexyl) phthalate	117-81-7	Soil	µg/kg	270	330	NA	Removed: Duplication error in database.
Calcium	7440-70-2	Soil	µg/kg	6.00E+06	6.00E+06	NA	Removed: Low toxicity.
Chromium	7440-47-3	Soil	µg/kg	24000	24000	NA	Removed: Below natural background.
Cobalt	7440-48-4	Soil	µg/kg	9000	9000	NA	Removed: Maximum value below screening level.
Copper	7440-50-8	Soil	µg/kg	24000	24000	NA	Removed: Maximum value below screening level.
Di-n-octylphthalate	117-84-0	Soil	µg/kg	229.4	700	660.2	Removed: Maximum value below screening level.
Fluorene	86-73-7	Soil	µg/kg	141.7	330	NA	Removed: Maximum value below screening level.
Iron	7439-89-6	Soil	µg/kg	1.90E+07	1.90E+07	NA	Removed: Low toxicity.
Kerosene	8008-20-6	Soil	µg/kg	1.24E+05	3.70E+05	NA	
Lead	7439-92-1	Soil	µg/kg	8407	15100	NA	Removed: Below natural background.
Magnesium	7439-95-4	Soil	µg/kg	4.90E+06	4.90E+06	NA	Removed: Low toxicity.
Manganese	7439-96-5	Soil	µg/kg	3.80E+05	3.80E+05	NA	Removed: Below natural background.
Moisture	MOISTURE	Soil	PERCENT	10.85	27.9	27.46	Removed: Soil parameter.
Naphthalene	91-20-3	Soil	µg/kg	2009	16000	12541	Removed: Maximum value below screening level.
Nickel	7440-02-0	Soil	µg/kg	22000	22000	NA	Removed: Maximum value below screening level.
Phenanthrene	85-01-8	Soil	µg/kg	127.8	330	NA	Removed: Maximum value below screening level.
Potassium	7440-09-7	Soil	µg/kg	1.10E+06	1.10E+06	NA	Removed: Low toxicity.
Sodium	7440-23-5	Soil	µg/kg	6.90E+05	6.90E+05	NA	Removed: Low toxicity.
TPH	TPH	Soil	µg/kg	9.12E+05	3.20E+07	9.31E+06	Removed: Maximum value below screening level.
TPH-diesel	TPH-diesel	Soil	µg/kg	4900	4900	NA	Removed: Value for TPH used.
Total Xylenes	1330-20-7	Soil	µg/kg	0.103	0.42	0.414	Removed: Maximum value below screening level.
Vanadium	7440-62-2	Soil	µg/kg	44000	44000	NA	Removed: Maximum value below screening level.
Zinc	7440-66-6	Soil	µg/kg	1.30E+05	1.30E+05	NA	Removed: Maximum value below screening level.

(a) = "Soil" represents subsurface soils of site (greater than 2 feet in depth).

(b) = UCL represents Upper Confidence Limit (UCL = Mean + 2*std)

TABLE 6.13 Chemicals Detected in Groundwater of ST48: Their Concentrations and Their Risk Evaluation Status

Analyte Measured	CAS Number	Matrix Code(a)	Units	Average Value	Max. Value Detected	95% UCL(b)	Risk Evaluation Status and Reason for Removal from Further Consideration
1,1,2-Trichloroethane	79-00-5	Water	µg/L	0.23	0.25	NA	Removed: Maximum value below screening level.
1,2-Dichloroethane	107-06-2	Water	µg/L	0.489	2.4	1.922	
1,4-Dichlorobenzene	106-46-7	Water	µg/L	2.386	5	NA	Removed: Qualified and not detected.
2,4-Dimethylphenol	105-67-9	Water	µg/L	2.601	10	8.9	
2-Methylnaphthalene	91-57-6	Water	µg/L	36.95	261	174.6	Removed: Maximum value below screening level.
4-Methylphenol	106-44-5	Water	µg/L	5.32	6.6	NA	Removed: Maximum value below screening level.
Aluminum (Unfiltered)	7429-90-5	Water	µg/L	2342	11900	11781	Removed: Low toxicity.
Antimony (Filtered)	7440-36-0	Water	µg/L	112.8	170	NA	Removed: Below natural background.
Antimony (Unfiltered)	7440-36-0	Water	µg/L	103.6	130	NA	Removed: Filtered values used for Antimony.
Arsenic (Filtered)	7440-38-2	Water	µg/L	14.17	25	NA	Removed: Below natural background.
Arsenic (Unfiltered)	7440-38-2	Water	µg/L	20.47	38	NA	Removed: Below natural background.
Barium (Filtered)	7440-39-3	Water	µg/L	263.3	590	NA	Removed: Unfiltered value used for Barium.
Barium (Unfiltered)	7440-39-3	Water	µg/L	387	722	NA	
Benzene	71-43-2	Water	µg/L	334.1	7100	2615	
Beryllium (Filtered)	7440-41-7	Water	µg/L	1.88	2	NA	Removed: Below natural background.
Beryllium (Unfiltered)	7440-41-7	Water	µg/L	1.58	1.9	NA	Removed: Filtered value used for Beryllium.
Bis (2-ethylhexyl)phthalate	117-81-7	Water	µg/L	45.12	700	383.5	Removed: Accidentally contaminated sample.
Butylbenzylphthalate	85-68-7	Water	µg/L	25.93	520	246.7	Removed: Maximum value below screening level.
Cadmium (Filtered)	7440-43-9	Water	µg/L	5.16	5.8	NA	Removed: Unfiltered value used for Cadmium.
Cadmium (Unfiltered)	7440-43-9	Water	µg/L	5.24	6.2	NA	Removed: Below natural background.
Calcium (Filtered)	7440-70-2	Water	µg/L	98667	1.74E+05	NA	Removed: Low toxicity.
Calcium (Unfiltered)	7440-70-2	Water	µg/L	89833	1.36E+05	NA	Removed: Low toxicity.
Chloride	16887-00-6	Water	µg/L	11250	11250	NA	Removed: Water quality parameter.
Chromium (Filtered)	7440-47-3	Water	µg/L	10.56	14	NA	Removed: Unfiltered value used for Chromium.
Chromium (Unfiltered)	7440-47-3	Water	µg/L	11.78	20	NA	Removed: Below natural background.
Cobalt (Filtered)	7440-48-4	Water	µg/L	7.88	10	NA	Removed: Unfiltered value used for Cobalt.
Cobalt (Unfiltered)	7440-48-4	Water	µg/L	10.35	18	NA	Removed: Maximum value below screening level.
Copper (Filtered)	7440-50-8	Water	µg/L	9.4	10	NA	Removed: Unfiltered value used for Copper.
Copper (Unfiltered)	7440-50-8	Water	µg/L	26.55	118	116.4	Removed: Maximum value below screening level.
Ethylbenzene	100-41-4	Water	µg/L	84.48	950	491.3	
Iron (Filtered)	7439-89-6	Water	µg/L	23995	71000	NA	Removed: Value below natural background.
Iron (Unfiltered)	7439-89-6	Water	µg/L	27817	70000	NA	Removed: Low toxicity.
Lead (Filtered)	7439-92-1	Water	µg/L	1.65	4	NA	Removed: Unfiltered value used for Lead.
Lead (Unfiltered)	7439-92-1	Water	µg/L	25.47	152	107.7	
Magnesium (Filtered)	7439-95-4	Water	µg/L	20817	36900	NA	Removed: Low toxicity.
Magnesium (Unfiltered)	7439-95-4	Water	µg/L	21783	43700	NA	Removed: Low toxicity.
Manganese (Filtered)	7439-96-5	Water	µg/L	3183	5200	NA	Removed: Unfiltered value used for Manganese.
Manganese (Unfiltered)	7439-96-5	Water	µg/L	3745	5870	NA	
Mercury (Filtered)	7439-97-6	Water	µg/L	0.233	0.7	NA	
Mercury (Unfiltered)	7439-97-6	Water	µg/L	0.2	0.4	NA	Removed: Filtered value used for Mercury.
Methylene Chloride	75-09-2	Water	µg/L	1.73	2.5	NA	
Naphthalene	91-20-3	Water	µg/L	76.88	440	330.6	

TABLE 6.13 Chemicals Detected in Groundwater of ST48: Their Concentrations and Their Risk Evaluation Status

Analyte Measured	CAS Number	Matrix Code(a)	Units	Average Value	Max. Value Detected	95% UCL(b)	Risk Evaluation Status and Reason for Removal from Further Consideration
Nickel (Unfiltered)	7440-02-0	Water	µg/L	17	25	NA	Removed: Maximum value below screening level.
Nitrog,NO2+NO3	7727-37-9	Water	µg/L	32.88	185	156.8	Removed: Water quality parameter.
Phenol	108-95-2	Water	µg/L	14.2	51	NA	Removed: Maximum value below screening level.
Potassium (Filtered)	7440-09-7	Water	µg/L	4183	6000	NA	Removed: Low toxicity.
Potassium (Unfiltered)	7440-09-7	Water	µg/L	4700	7200	NA	Removed: Low toxicity.
Residue, DISS	RESIDUEDISS	Water	µg/L	3.28E+05	7.04E+05	6.39E+05	Removed: Water quality parameter.
Silver (Filtered)	7440-22-4	Water	µg/L	5.34	10	NA	Removed: Unfiltered value used for Silver.
Silver (Unfiltered)	7440-22-4	Water	µg/L	6.68	10	NA	Removed: Maximum value below screening level.
Sodium (Filtered)	7440-23-5	Water	µg/L	8683	11000	NA	Removed: Low toxicity.
Sodium (Unfiltered)	7440-23-5	Water	µg/L	9017	13200	NA	Removed: Low toxicity.
Sulfate	SULFATE	Water	µg/L	1.31E+05	1.31E+05	NA	Removed: Water quality parameter.
TPH	TPH	Water	µg/L	27250	4.00E+05	2.21E+05	
Tetrachloroethene	127-18-4	Water	µg/L	0.706	3.3	2.775	
Tin (Unfiltered)	7440-31-5	Water	µg/L	50.4	52	NA	Removed: Maximum value below screening level.
Toluene	108-88-3	Water	µg/L	353.2	6600	2815	
Total Xylenes	1330-20-7	Water	µg/L	246.6	1990	1283	Removed: Value for m,p-Xylene used.
Trichloroethene	79-01-6	Water	µg/L	0.733	2.1	1.829	
Vanadium (Filtered)	7440-62-2	Water	µg/L	12.92	15	N/A	Removed: Unfiltered value used for Vanadium.
Vanadium (Unfiltered)	7440-62-2	Water	µg/L	16.45	37	NA	Removed: Below natural background.
Zinc (Filtered)	7440-66-6	Water	µg/L	11.68	30	NA	Removed: Unfiltered value used for Zinc.
Zinc (Unfiltered)	7440-66-6	Water	µg/L	20	72.4	NA	
cis-1,2-Dichloroethylene	156-59-2	Water	µg/L	0.746	1.4	NA	Removed: Maximum value below screening level.
m,p-Xylene	108-38-3	Water	µg/L	445.3	3300	2251	
oXylene	95-47-6	Water	µg/L	172.5	1300	828.3	Removed: Value for m,p-Xylene used.
trans-1,2-Dichloroethylene	156-60-5	Water	µg/L	17.37	490	196	
(a) = "Water" represents groundwater beneath the site							
(b) = UCL represents Upper Confidence Limit (UCL = Mean + 2*std)							

TABLE 6.14 Chemicals Detected in Surface Soils of ST49: Their Concentrations and Their Risk Evaluation Status

Analyte Measured	CAS Number	Matrix Code(a)	Units	Average Value	Max. Value Detected	95% UCL(b)	Risk Evaluation Status and Reason for Removal from Further Consideration
1,1-Dichloroethane	75-34-3	Soil	µg/kg	0.8	2	NA	Removed: Maximum value below screening level.
4,4'-DDD	72-54-8	Soil	µg/kg	630	850	NA	Removed: Maximum value below screening level.
4,4'-DDE	72-55-9	Soil	µg/kg	157	240	NA	
4,4'-DDT	50-29-3	Soil	µg/kg	1640	2900	NA	
Aldrin	309-00-2	Soil	µg/kg	3.25	5	NA	Removed: Qualified and not detected.
Benzene	71-43-2	Soil	µg/kg	0.886	1	NA	Removed: Qualified and not detected.
Benzo(a)anthracene	56-55-3	Soil	µg/kg	365	470	NA	Removed: Qualified and not detected.
Benzo(a)pyrene	50-32-8	Soil	µg/kg	385	550	NA	Removed: Qualified and not detected.
Benzo(b)fluoranthene	205-99-2	Soil	µg/kg	372.5	500	NA	Removed: Qualified and not detected.
Benzo(ghi)perylene	191-24-2	Soil	µg/kg	322.5	330	NA	Removed: Qualified and not detected.
Benzo(k)fluoranthene	207-08-9	Soil	µg/kg	380	530	NA	Removed: Qualified and not detected.
Beta-BHC	319-85-7	Soil	µg/kg	2.72	5	NA	Removed: Qualified and not detected.
Bis(2-ethylhexyl) phthalate	117-81-7	Soil	µg/kg	490	860	NA	Removed: Maximum value below screening level.
Chlordane	57-74-9	Soil	µg/kg	1063	2100	NA	
Chrysene	218-01-9	Soil	µg/kg	402.5	620	NA	Removed: Qualified and not detected.
Dieldrin	60-57-1	Soil	µg/kg	17.5	30	NA	
Ethylbenzene	100-41-4	Soil	µg/kg	1.02	1.1	NA	Removed: Qualified and not detected.
Fluoranthene	206-44-0	Soil	µg/kg	490	970	NA	Removed: Maximum value below screening level.
Heptachlor	76-44-8	Soil	µg/kg	6.05	7.1	NA	Removed: Qualified and not detected.
Heptachlor epoxide	1024-57-3	Soil	µg/kg	22	30	NA	Removed: Qualified and not detected.
Indeno(1,2,3-cd)pyrene	193-39-5	Soil	µg/kg	322.5	330	NA	Removed: Qualified and not detected.
Moisture	MOISTURE	Soil	PERCENT	11.3	13.7	NA	Removed: Soil parameter.
Phenanthrene	85-01-8	Soil	µg/kg	385	550	NA	Removed: Qualified and not detected.
Pyrene	129-00-0	Soil	µg/kg	490	970	NA	Removed: Maximum value below screening level.
TPH	TPH	Soil	µg/kg	45705	1.76E+05	1.43E+05	Removed: Maximum value below screening level.
Toluene	108-88-3	Soil	µg/kg	2.552	7.5	NA	Removed: Qualified and not detected.
Total Xylenes	1330-20-7	Soil	µg/kg	3.414	7.1	NA	Removed: Qualified and not detected.
cis-1,2-Dichloroethylene	156-59-2	Soil	µg/kg	.	.	.	Removed: Qualified and not detected.

(a) = "Soil" represents surface soils of site (less than 2 feet in depth).
(b) = UCL represents Upper Confidence Limit (UCL = Mean + 2*std)

TABLE 6.15 Chemicals Detected in Subsurface Soils of ST49: Their Concentrations and Their Risk Evaluation Status

Analyte Measured	CAS Number	Matrix Code(a)	Units	Average Value	Max. Value Detected	95% UCL(b)	Risk Evaluation Status and Reason for Removal from Further Consideration
1,4-Dichlorobenzene	106-46-7	Soil	µg/kg	165.2	330	NA	Removed: Qualified and not detected.
4,4'-DDD	72-54-8	Soil	µg/kg	190	190	NA	
Benzene	71-43-2	Soil	µg/kg	0.56	0.56	NA	Removed: Qualified and not detected.
Beta-BHC	319-85-7	Soil	µg/kg	1.7	1.7	NA	Removed: Qualified and not detected.
Ethylbenzene	100-41-4	Soil	µg/kg	2.9	2.9	NA	Removed: Qualified and not detected.
Moisture	MOISTURE	Soil	PERCENT	27.95	33	NA	Removed: Soil parameter.
TPH	TPH	Soil	µg/kg	1.03E+05	8.60E+05	5.57E+05	Removed: Maximum value below screening level.
Toluene	108-88-3	Soil	µg/kg	0.68	0.68	NA	Removed: Qualified and not detected.
Total Xylenes	1330-20-7	Soil	µg/kg	30	30	NA	Removed: Qualified and not detected.
cis-1,2-Dichloroethylene	156-59-2	Soil	µg/kg	.	.	.	Removed: Qualified and not detected.
(a) = "Soil" represents subsurface soils of site (greater than 2 feet in depth).							
(b) = UCL represents Upper Confidence Limit (UCL = Mean + 2*std)							

TABLE 6.16 Chemicals Detected in Groundwater of ST49: Their Concentrations and Their Risk Evaluations Status

Analyte Measured	CAS Number	Matrix Code(s)	Units	Average Value	Max. Value Detected	95% UCL(b)	Risk Evaluation Status and Reason for Removal from Further Consideration
1,1,1-Trichloroethane	71-55-6	Water	µg/L	0.662	4.77	2.937	Removed: Maximum value below screening level.
1,1-Dichloroethane	75-34-3	Water	µg/L	0.485	1.57	1.221	Removed: Maximum value below screening level.
1,2-Dichlorobenzene	95-50-1	Water	µg/L	2.117	5	NA	Removed: Maximum value below screening level.
1,4-Dichlorobenzene	106-46-7	Water	µg/L	2.391	5	NA	Removed: Maximum value below screening level.
2-Methylnaphthalene	91-57-6	Water	µg/L	28.34	140	134.8	Removed: Maximum value below screening level.
Acenaphthene	83-32-9	Water	µg/L	3.795	6.43	NA	Removed: Maximum value below screening level.
Aluminum (Filtered)	7429-90-5	Water	µg/L	84.67	100	NA	Removed: Low toxicity.
Aluminum (Unfiltered)	7429-90-5	Water	µg/L	3933	13200	NA	Removed: Low toxicity.
Anthracene	120-12-7	Water	µg/L	2.507	5	NA	Removed: Maximum value below screening level.
Arsenic (Filtered)	7440-38-2	Water	µg/L	6.25	10	NA	Removed: Unfiltered value used.
Arsenic (Unfiltered)	7440-38-2	Water	µg/L	11.1	22.4	NA	Removed: Below natural background.
Barium (Filtered)	7440-39-3	Water	µg/L	215	300	NA	Removed: Unfiltered value used.
Barium (Unfiltered)	7440-39-3	Water	µg/L	287	418	NA	
Benzene	71-43-2	Water	µg/L	1.724	8.2	5.338	
Benzo(A)Anthracene	56-55-3	Water	µg/L	0.006	0.026	NA	
Benzo(A)Pyrene	50-32-8	Water	µg/L	0.004	0.015	NA	
Benzo(B)Fluoranthene	205-99-2	Water	µg/L	0.004	0.012	NA	Removed: Maximum value below screening level.
Benzo(G,H,I)Perylene	191-24-2	Water	µg/L	0.006	0.023	NA	
Benzo(K)Fluoranthene	207-08-9	Water	µg/L	0.002	0.008	0.008	Removed: Maximum value below screening level.
Beryllium (Unfiltered)	7440-41-7	Water	µg/L	1.313	1.5	NA	Removed: Qualified and not detected.
Bis(2-ethylhexyl) phthalate	117-81-7	Water	µg/L	124.2	720	708	Removed: Qualified and not detected.
Calcium (Filtered)	7440-70-2	Water	µg/L	60975	70000	NA	Removed: Low toxicity.
Calcium (Unfiltered)	7440-70-2	Water	µg/L	62750	67000	NA	Removed: Low toxicity.
Chloride	16887-00-6	Water	µg/L	2027	2027	NA	Removed: Water quality parameter.
Chlorobenzene	108-90-7	Water	µg/L	0.212	0.432	0.38	Removed: Maximum value below screening level.
Chloroform	67-66-3	Water	µg/L	0.144	0.25	NA	
Chromium (Unfiltered)	7440-47-3	Water	µg/L	11.55	18.1	NA	Removed: Below natural background.
Chrysene	218-01-9	Water	µg/L	0.02	0.03	NA	Removed: Maximum value below screening level.
Cobalt (Unfiltered)	7440-48-4	Water	µg/L	10.28	16.4	NA	Removed: Maximum value below screening level.
Copper (Unfiltered)	7440-50-8	Water	µg/L	25.55	62.2	NA	Removed: Maximum value below screening level.
Dibenz(a,h)anthracene	53-70-3	Water	µg/L	0.002	0.005	NA	
Dibenzofuran	132-64-9	Water	µg/L	3.064	5	NA	Removed: Maximum value below screening level.
Ethylbenzene	100-41-4	Water	µg/L	1.852	16	8.191	Removed: Maximum value below screening level.
Fluoranthene	206-44-0	Water	µg/L	2.534	5	7.689	Removed: Maximum value below screening level.
Fluorene	86-73-7	Water	µg/L	4.019	11	NA	Removed: Maximum value below screening level.
Indeno(1,2,3-cd)pyrene	193-39-5	Water	µg/L	0.007	0.009	NA	Removed: Maximum value below screening level.
Iron (Filtered)	7439-89-6	Water	µg/L	4955	12000	NA	Removed: Low toxicity.
Iron (Unfiltered)	7439-89-6	Water	µg/L	11700	18600	NA	Removed: Low toxicity.
Kerosene	8008-20-6	Water	µg/L	3801	5000	NA	Removed: Qualified and not detected.
Lead (Filtered)	7439-92-1	Water	µg/L	2.333	2.5	NA	Removed: Qualified and not detected.
Lead (Unfiltered)	7439-92-1	Water	µg/L	7.525	20.8	NA	
Magnesium (Filtered)	7439-95-4	Water	µg/L	12850	14000	NA	Removed: Low toxicity.

TABLE 6.16 Chemicals Detected in Groundwater of ST49: Their Concentrations and Their Risk Evaluations Status

Analyte Measured	CAS Number	Matrix Code(a)	Units	Average Value	Max. Value Detected	95% UCL(b)	Risk Evaluation Status and Reason for Removal from Further Consideration
Magnesium (Unfiltered)	7439-95-4	Water	µg/L	14275	18100	NA	Removed: Low toxicity.
Manganese (Filtered)	7439-96-5	Water	µg/L	2550	3800	NA	Removed: Value below natural background.
Manganese (Unfiltered)	7439-96-5	Water	µg/L	2790	3700	NA	Removed: Value below natural background.
Mercury (Filtered)	7439-97-6	Water	µg/L	0.167	0.3	NA	Removed: Unfiltered value used.
Mercury (Unfiltered)	7439-97-6	Water	µg/L	0.2	0.4	NA	
Methylene Chloride	75-09-2	Water	µg/L	583.5	1310	NA	Removed: Not confirmed in 1993 sampling.
Naphthalene	91-20-3	Water	µg/L	12.43	62	50.22	Removed: Not confirmed in 1993 sampling.
Nickel (Unfiltered)	7440-02-0	Water	µg/L	17.8	26.2	NA	Removed: Maximum value below screening level.
Phenanthrene	85-01-8	Water	µg/L	4.331	21	15.87	Removed: Not confirmed in 1993 sampling.
Potassium (Filtered)	7440-09-7	Water	µg/L	3235	4000	NA	Removed: Low toxicity.
Potassium (Unfiltered)	7440-09-7	Water	µg/L	4440	5760	NA	Removed: Low toxicity.
Pyrene	129-00-0	Water	µg/L	2.583	5	NA	Removed: Maximum value below screening level.
Residue, DISS	DISS	Water	µg/L	2.75E+05	3.22E+05	NA	Removed: Water quality parameter.
Silver (Unfiltered)	7440-22-4	Water	µg/L	7.933	10	NA	Removed: Maximum value below screening level.
Sodium (Filtered)	7440-23-5	Water	µg/L	5278	5800	NA	Removed: Low toxicity.
Sodium (Unfiltered)	7440-23-5	Water	µg/L	5735	6840	NA	Removed: Low toxicity.
Sulfate	SULFATE	Water	µg/L	63810	63810	NA	Removed: Water quality parameter.
TPH	TPH	Water	µg/L	6282	32300	31739	
Toluene	108-88-3	Water	µg/L	0.472	1	0.936	Removed: Maximum value below screening level.
Total Xylenes	1330-20-7	Water	µg/L	5.635	37	26.12	Removed: Maximum value below screening level.
Trans-1,2-Dichloroethene	156-60-5	Water	µg/L	0.219	0.4	0.355	Removed: Maximum value below screening level.
Trichloroethene	79-01-6	Water	µg/L	1.688	8.2	5.73	
Vanadium (Unfiltered)	7440-62-2	Water	µg/L	17.55	28.2	NA	Removed: Below natural background.
Vinyl Chloride	75-01-4	Water	µg/L	1	1	1	Removed: Qualified and not detected.
Zinc (Filtered)	7440-66-6	Water	µg/L	19.33	60	NA	Removed: Unfiltered value used.
Zinc (Unfiltered)	7440-66-6	Water	µg/L	37.18	79.9	NA	Removed: Maximum value below screening level.
cis-1,2-Dichloroethylene	156-59-2	Water	µg/L	1.087	3	NA	Removed: Maximum value below screening level.
m,p-Xylene	108-38-3	Water	µg/L	3.425	37	20.27	Removed: Maximum value below screening level.
oXylene	95-47-6	Water	µg/L	2.575	24	15.06	Removed: Maximum value below screening level.
trans-1,2-Dichloroethylene	156-60-5	Water	µg/L	0.462	0.5	NA	Removed: Duplication error in database.
trans-1,2-Dichloroethylene	TDICHLOR	Water	µg/L	0.575	2	1.246	Removed: Duplication error in database.
(a) = "Water" represents groundwater beneath the site							
(b) = UCL represents Upper Confidence Limit (UCL = Mean + 2*std)							

TABLE 6.17 Chemicals Detected in Surface Soils of ST50 (Blairs Lake): Their Concentrations and Their Risk Evaluation Status

Analyte Measured	CAS Number	Matrix Code(a)	Units	Average Value	Max. Value Detected	95% UCL(b)	Risk Evaluation Status and Reason for Removal from Further Consideration
2-Methylnaphthalene	91-57-6	Soil	µg/kg	28587	95000	NA	Removed: Maximum value below screening level.
Aluminum	7429-90-5	Soil	µg/kg	7.55E+06	1.05E+07	NA	Removed: Low toxicity.
Arsenic	7440-38-2	Soil	µg/kg	4104	8650	8558	
Barium	7440-39-3	Soil	µg/kg	1.58E+05	2.69E+05	NA	Removed: Maximum value below screening level.
Benzene	71-43-2	Soil	µg/kg	706.3	3470	3465	
Cadmium	7440-43-9	Soil	µg/kg	1002	1390	NA	
Calcium	7440-70-2	Soil	µg/kg	2.52E+06	3.53E+06	NA	Removed: Low toxicity.
Chromium	7440-47-3	Soil	µg/kg	15083	19700	NA	
Cobalt	7440-48-4	Soil	µg/kg	8755	12600	NA	Removed: Maximum value below screening level.
Copper	7440-50-8	Soil	µg/kg	20477	28700	NA	Removed: Maximum value below screening level.
Dibenzofuran	132-64-9	Soil	µg/kg	866.7	4800	4732	Removed: Maximum value below screening level.
Ethylbenzene	100-41-4	Soil	µg/kg	7987	31000	NA	Removed: Maximum value below screening level.
Fluorene	86-73-7	Soil	µg/kg	101.7	400	NA	Removed: Maximum value below screening level.
Iron	7439-89-6	Soil	µg/kg	1.77E+07	2.41E+07	NA	Removed: Low toxicity.
Lead	7439-92-1	Soil	µg/kg	16496	26200	NA	
Magnesium	7439-95-4	Soil	µg/kg	3.59E+06	4.95E+06	NA	Removed: Low toxicity.
Manganese	7439-96-5	Soil	µg/kg	3.78E+05	4.73E+05	NA	
Moisture	MOISTURE	Soil	PERCENT	11.07	18	NA	Removed: Soil parameter.
Naphthalene	91-20-3	Soil	µg/kg	13015	45000	NA	Removed: Maximum value below screening level.
Nickel	7440-02-0	Soil	µg/kg	17732	24300	NA	Removed: Maximum value below screening level.
Potassium	7440-09-7	Soil	µg/kg	9.37E+05	1.38E+06	NA	Removed: Low toxicity.
Sodium	7440-23-5	Soil	µg/kg	1.07E+05	1.38E+05	NA	Removed: Low toxicity.
TPH	TPH	Soil	µg/kg	4.71E+05	3.07E+06	2.03E+06	Removed: Maximum value below screening level.
Toluene	108-88-3	Soil	µg/kg	9995	40000	NA	Removed: Maximum value below screening level.
Total Xylenes	1330-20-7	Soil	µg/kg	99180	2.93E+05	NA	Removed: Maximum value below screening level.
Vanadium	7440-62-2	Soil	µg/kg	16615	22100	NA	Removed: Maximum value below screening level.
Zinc	7440-66-6	Soil	µg/kg	77633	1.08E+05	NA	Removed: Maximum value below screening level.
(a) = "Soil" represents surface soils of site (less than 2 feet in depth).							
(b) = UCL represents Upper Confidence Limit (UCL = Mean + 2*std)							

TABLE 6.18 Chemicals Detected in Subsurface Soils of ST50 (Blairs Lake): Their Concentrations and Their Risk Evaluation Status

Analyte Measured	CAS Number	Matrix Code(s)	Units	Average Value	Max. Value Detected	95% UCL(b)	Risk Evaluation Status and Reason for Removal from Further Consideration
2-Chlorophenol	95-57-8	Soil	µg/kg	405.6	4150	2299	Removed: Maximum value below screening level.
2-Methylnaphthalene	91-57-6	Soil	µg/kg	35904	3.20E+05	2.00E+05	Removed: Maximum value below screening level.
Acenaphthene	83-32-9	Soil	µg/kg	175.5	1800	995.6	Removed: Maximum value below screening level.
Acetophenone	98-86-2	Soil	µg/kg	5371	75000	45452	Removed: Maximum value below screening level.
Aluminum	7429-90-5	Soil	µg/kg	1.06E+07	1.39E+07	NA	Removed: Low toxicity.
Arsenic	7440-38-2	Soil	µg/kg	5696	18200	17947	
Barium	7440-39-3	Soil	µg/kg	2.30E+05	3.66E+05	NA	Removed: Maximum value below screening level.
Benzene	71-43-2	Soil	µg/kg	414.7	3790	2787	
Beryllium	7440-41-7	Soil	µg/kg	236.7	620	612.3	
Bis (2-ethylhexyl)phthalate	117-81-7	Soil	µg/kg	71	700	369.7	Removed: Maximum value below screening level.
Cadmium	7440-43-9	Soil	µg/kg	1208	1990	NA	
Calcium	7440-70-2	Soil	µg/kg	3.59E+06	5.69E+06	NA	Removed: Low toxicity.
Chromium	7440-47-3	Soil	µg/kg	19567	25800	NA	
Cobalt	7440-48-4	Soil	µg/kg	11165	15300	NA	Removed: Maximum value below screening level.
Copper	7440-50-8	Soil	µg/kg	28482	42700	NA	Removed: Maximum value below screening level.
Dibenzofuran	132-64-9	Soil	µg/kg	803.3	11000	5943	Removed: Maximum value below screening level.
Ethylbenzene	100-41-4	Soil	µg/kg	25339	1.70E+05	1.37E+05	Removed: Maximum value below screening level.
Fluorene	86-73-7	Soil	µg/kg	776.3	12000	6122	Removed: Maximum value below screening level.
Iron	7439-89-6	Soil	µg/kg	2.39E+07	3.43E+07	NA	Removed: Low toxicity.
Lead	7439-92-1	Soil	µg/kg	19955	31900	NA	
Magnesium	7439-95-4	Soil	µg/kg	5.26E+06	7.44E+06	NA	Removed: Low toxicity.
Manganese	7439-96-5	Soil	µg/kg	3.46E+05	6.61E+05	NA	
Moisture	MOISTURE	Soil	PERCENT	16.9	36.7	34.8	Removed: Soil parameter.
N-Nitrosopiperidine	100-75-4	Soil	µg/kg	49.29	320	230.9	Removed: Accidentally contaminated sample.
Naphthalene	91-20-3	Soil	µg/kg	18571	1.60E+05	1.03E+05	Removed: Maximum value below screening level.
Nickel	7440-02-0	Soil	µg/kg	24983	38600	NA	Removed: Maximum value below screening level.
Phenol	108-95-2	Soil	µg/kg	402.3	4150	2298	Removed: Maximum value below screening level.
Potassium	7440-09-7	Soil	µg/kg	1.25E+06	1.72E+06	NA	Removed: Low toxicity.
Sodium	7440-23-5	Soil	µg/kg	1.31E+05	2.16E+05	NA	Removed: Low toxicity.
TPH	TPH	Soil	µg/kg	5.28E+06	9.18E+07	3.88E+07	Removed: 95% UCL value below screening level.
Toluene	108-88-3	Soil	µg/kg	15082	1.50E+05	1.10E+05	Removed: Maximum value below screening level.
Total Xylenes	1330-20-7	Soil	µg/kg	2.12E+05	1.47E+06	1.17E+06	Removed: Maximum value below screening level.
Vanadium	7440-62-2	Soil	µg/kg	22633	29000	NA	Removed: Maximum value below screening level.

TABLE 6.18 Chemicals Detected in Subsurface Soils of ST50 (Blairs Lake): Their Concentrations and Their Risk Evaluation Status

Analyte Measured	CAS Number	Matrix Code(a)	Units	Average Value	Max. Value Detected	95% UCL(b)	Risk Evaluation Status and Reason for Removal from Further Consideration
Zinc	7440-66-6	Soil	µg/kg	1.02E+05	1.57E+05	NA	Removed: Maximum value below screening level.
(a) = "Soil" represents subsurface soils of site (greater than 2 feet in depth).							
(b) = UCL represents Upper Confidence Limit (UCL = Mean + 2*std)							

TABLE 6.19 Chemicals Detected in Groundwater of ST50 (Blairs Lake): Their Concentrations and Their Risk Evaluation Status

Analyte Measured	CAS Number	Matrix Code(s)	Units	Average Value	Max. Value Detected	95% UCL(b)	Risk Evaluation Status and Reason for Removal from Further Consideration
1,2-Dichloroethane	107-06-2	Water	µg/L	0.268	0.43	0.382	Removed: Qualified and not detected.
2,4-Dimethylphenol	105-67-9	Water	µg/L	2.495	5	NA	Removed: Maximum value below screening level.
2-Methylnaphthalene	91-57-6	Water	µg/L	598.2	12000	5827	
Alkalinity	ALKALINITY	Water	µg/L	170	170	NA	Removed: Water quality parameter.
Aluminum (Filtered)	7429-90-5	Water	µg/L	66.2	100	NA	Removed: Low toxicity.
Aluminum (Unfiltered)	7429-90-5	Water	µg/L	26844	90600	87142	Removed: Low toxicity.
Arsenic (Filtered)	7440-38-2	Water	µg/L	4	17	13.53	Removed: Value below natural background.
Arsenic (Unfiltered)	7440-38-2	Water	µg/L	21.63	100	71.86	
Barium (Filtered)	7440-39-3	Water	µg/L	160.7	700	524	Removed: Unfiltered value used.
Barium (Unfiltered)	7440-39-3	Water	µg/L	736.7	4180	2801	
Benzene	71-43-2	Water	µg/L	35.59	335	210.4	
Beryllium (Filtered)	7440-41-7	Water	µg/L	1.372	1.5	NA	Removed: Qualified and not detected.
Beryllium (Unfiltered)	7440-41-7	Water	µg/L	1.91	4	3.525	
Bis (2-ethylhexyl)phthalate	117-81-7	Water	µg/L	4.1	4.1	NA	Removed: Duplication error in database.
Bis(2-ethylhexyl) phthalate	117-81-7	Water	µg/L	0	0	NA	Removed: No detections in 1993 comfirmation sampling.
Butylbenzylphthalate	85-68-7	Water	µg/L	3.2	12	8.932	Removed: Maximum value below screening level.
Cadmium (Unfiltered)	7440-43-9	Water	µg/L	6.487	20	NA	
Calcium (Filtered)	7440-70-2	Water	µg/L	59175	1.40E+05	1.12E+05	Removed: Low toxicity.
Calcium (Unfiltered)	7440-70-2	Water	µg/L	71847	1.50E+05	1.20E+05	Removed: Low toxicity.
Chloride	12595-89-0	Water	µg/L	1300	2900	NA	Removed: Water quality parameter.
Chloride	CHLORIDE	Water	µg/L	1738	5877	NA	Removed: Water quality parameter.
Chlorobenzene	108-90-7	Water	µg/L	1.73	1.73	NA	Removed: Maximum value below screening level.
Chloroform	67-66-3	Water	µg/L	0	0	NA	Removed: No detections in 1993 comfirmation sampling.
Chloromethane	74-87-3	Water	µg/L	7.463	100	60.73	
Chromium (Filtered)	7440-47-3	Water	µg/L	9.68	10	NA	Removed: Qualified and not detected.
Chromium (Unfiltered)	7440-47-3	Water	µg/L	104.4	820	519	
Cobalt (Filtered)	7440-48-4	Water	µg/L	10.6	16	14.39	Removed: Unfiltered value used.
Cobalt (Unfiltered)	7440-48-4	Water	µg/L	33.53	150	112.1	
Copper (Filtered)	7440-50-8	Water	µg/L	6.287	10	NA	Removed: Unfiltered value used.
Copper (Unfiltered)	7440-50-8	Water	µg/L	112	511	400.8	
Diethylphthalate	84-66-2	Water	µg/L	2.505	6.6	NA	Removed: Maximum value below screening level.
Ethylbenzene	100-41-4	Water	µg/L	136.6	2210	1031	
Fluoride	16984-48-8	Water	µg/L	500	600	NA	Removed: Qualified and not detected.
Iron (Filtered)	7439-89-6	Water	µg/L	2037	25000	14789	Removed: Low toxicity.
Iron (Unfiltered)	7439-89-6	Water	µg/L	67109	3.09E+05	2.37E+05	Removed: Low toxicity.
Kerosene	8008-20-6	Water	µg/L	4376	5000	NA	Removed: Qualified and not detected.
Lead (Filtered)	7439-92-1	Water	µg/L	2.46	8.5	6.004	Removed: Value below natural background.
Lead (Unfiltered)	7439-92-1	Water	µg/L	94.13	400	317.9	
Magnesium (Filtered)	7439-95-4	Water	µg/L	10813	24000	19017	Removed: Low toxicity.
Magnesium (Unfiltered)	7439-95-4	Water	µg/L	22092	51900	48178	Removed: Low toxicity.
Manganese (Filtered)	7439-96-5	Water	µg/L	2154	15000	9902	Removed: Values same as natural background.

TABLE 6.19 Chemicals Detected in Groundwater of ST50 (Blairs Lake): Their Concentrations and Their Risk Evaluation Status

Analyte Measured	CAS Number	Matrix Code(a)	Units	Average Value	Max. Value Detected	95% UCL(b)	Risk Evaluation Status and Reason for Removal from Further Consideration
Manganese (Unfiltered)	7439-96-5	Water	µg/L	5953	34600	24207	
Mercury (Filtered)	7439-97-6	Water	µg/L	0.12	0.3	0.246	Removed: Unfiltered value used.
Mercury (Unfiltered)	7439-97-6	Water	µg/L	0.37	1.3	1.165	
Methylene Chloride	75-09-2	Water	µg/L	15.36	350	154.8	Removed: Qualified and not detected.
Molybdenum (Unfiltered)	7439-98-7	Water	µg/L	17.32	51.8	NA	
Naphthalene	91-20-3	Water	µg/L	41	190	NA	
Nickel (Filtered)	7440-02-0	Water	µg/L	15.8	23	20.86	Removed: Qualified and not detected.
Nickel (Unfiltered)	7440-02-0	Water	µg/L	65.03	344	235.9	
Nitrate	14797-55-8	Water	µg/L	416.7	1100	NA	Removed: Water quality parameter.
Nitrog,NO2+NO3	7727-37-9	Water	µg/L	24.4	102	NA	Removed: Water quality parameter.
Phenol	108-95-2	Water	µg/L	2.648	6.8	NA	Removed: Maximum value below screening level.
Potassium (Filtered)	7440-09-7	Water	µg/L	1881	6000	4334	Removed: Low toxicity.
Potassium (Unfiltered)	7440-09-7	Water	µg/L	5349	13000	12886	Removed: Low toxicity.
Residue, DISS	RESIDUE	Water	µg/L	2.79E+05	3.16E+05	NA	Removed: Water quality parameter.
Silver (Filtered)	7440-22-4	Water	µg/L	8.22	10	NA	Removed: Unfiltered value used.
Silver (Unfiltered)	7440-22-4	Water	µg/L	8.85	10	NA	Removed: Maximum value below screening level.
Sodium (Filtered)	7440-23-5	Water	µg/L	4026	9700	8470	Removed: Low toxicity.
Sodium (Unfiltered)	7440-23-5	Water	µg/L	5510	13000	12783	Removed: Low toxicity.
Sulfate	14808-79-8	Water	µg/L	37000	39000	NA	Removed: Water quality parameter.
Sulfate	SULFATE	Water	µg/L	39628	64080	NA	Removed: Duplication error in database.
TPH	TPH	Water	µg/L	8.59E+03	1.19E+05	NA	
Toluene	108-88-3	Water	µg/L	311.5	2080	1125	
Total Xylenes	1330-20-7	Water	µg/L	464	6940	3358	
Total dissolved solids	TDS	Water	µg/L	240	240	NA	Removed: Water quality parameter.
Vanadium (Filtered)	7440-62-2	Water	µg/L	13.93	15	NA	Removed: Qualified and not detected.
Vanadium (Unfiltered)	7440-62-2	Water	µg/L	64.3	254	205.4	
Vinyl Chloride	75-01-4	Water	µg/L	1	1	1	Removed: Qualified and not detected.
Zinc (Filtered)	7440-66-6	Water	µg/L	82.13	970	674.7	Removed: Unfiltered value used.
Zinc (Unfiltered)	7440-66-6	Water	µg/L	521.5	3700	2413	
(a) = "Water" represents groundwater beneath the site							
(b) = UCL represents Upper Confidence Limit (UCL = Mean + 2*std)							

Exposure duration for soils and sediments, both ingestion and dermal contact, and particulate inhalation differ from standard EPA default parameters. The values were adjusted to compensate for the sub-arctic climate at Eielson AFB. The values used (146 days for industrial and 180 days for residential) were adjusted based on the number of days in Fairbanks without snow cover. The mean number of days without snow cover at Fairbanks is 146 days; 180 days is presented as a reasonable maximum value. These values were initially advanced in Appendix A of the *Remedial Investigation/Feasibility Study--Operable Units 3, 4, and 5 Management Plan, Eielson Air Force Base, Alaska* (Battelle 1992). The effect of adjustment is discussed in the uncertainty section 6.1.5.

The input concentrations for benzene in groundwater for future scenarios at ST48 are derived from fate and transport modeling using the Multimedia Environmental Pollutant Assessment System (MEPAS), a computerized modeling system developed by Pacific Northwest Laboratory. The results indicated that benzene concentrations have been and will continue to increase, exceeding their MCLs. The modeling scenario, however, is very conservative and does not include natural dilution and dispersion.

For a more detailed description of the models used, see Section 4.0 of the remedial investigation (U.S. Air Force 1994b).

6.1.3 Toxicity Assessment

The values and references for all toxicity data used in the risk assessment are given in Table 6.20. Toxicity data are divided into carcinogenic (slope factors [SFs]) and noncarcinogenic (reference doses [RfDs]).

SFs have been developed by EPA's Carcinogenic Assessment Group for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic contaminants of concern. SFs which are expressed in units of $(mg/kg\text{-}day)^{-1}$, are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to provide an upper-bound estimate of the excess lifetime cancer risk associated with exposure at that intake level. The term "upper bound" reflects the the conservative estimate of the risks calculated from the SF. Use of this approach makes the underestimation of the actual cancer risk highly unlikely. SFs are derived from the results of human epidemiological studies or chronic animal bioassays to which animal-to-human extrapolation and uncertainty factors have been applied (e.g., to account for the use of animal data to predict effects on humans).

RfDs have been developed by EPA to indicate the potential for adverse health effects from exposure to contaminants of concern exhibiting noncarcinogenic effects. RfDs, which are expressed in units of mg/kg-day, are estimates of lifetime daily exposure levels for humans, including sensitive individuals. Estimated intakes of contaminants of concern from environmental media (e.g., the amount of a contaminant of concern ingested from contaminated drinking water) can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty

TABLE 6.20 Toxicity Data

ANALYTE	CAS #	EPA WOE(a)	Ref.	CANCER POTENCY FACTOR (mg/kg•d)-1 Oral	Ref.	(mg/kg•d)-1 Inhalation	Ref.	RfD (mg/kg•d) Oral	Ref.	RfD mg/kg•d) nhalation	Ref.
VOLATILES											
1,1,2,2 -TETRACHLOROETHANE	79345	C		2.00E-01	t						
1,1,1-TRICHLOROETHANE	71556	D	b					9.00E-02	c,s,t	3.00E-01	g,s,t
1,1,2 -TRICHLOROETHANE	79005	C	t	5.70E-02	t			4.00E-03	t		
1,1-DICHLOROETHANE	75343	C	b	6.00E-01	h	1.20E+00	h	1.00E-01	c,s,t	1.00E-01	g
1,1-DICHLOROETHENE	75354	C	b	6.00E-01	b,s,t	1.20E+00	g,s	9.00E-03	b,s,t	9.00E-03	f
1,2-DICHLOROETHANE	107062	B2	t	9.10E-02	t	9.10E-02	t,f				
1,2-DICHLOROETHENE (CIS)	156592	D	t					1.00E-02	g		
1,2-DICHLOROETHENE (TRANS)	156605	nr						2.00E-02	b,s	2.00E-02	f
BENZENE	71432	A	b	2.90E-02	b,s,t	2.90E-02	b,q,s		s,t		s,t
CHLOROBENZENE	108907	D	b		s,t		s,t	2.00E-02	b,s,t	5.00E-03	g,s
CHLOROFORM	67663	B2	b	6.10E-03	b,s,t	8.10E-02	g,s	1.00E-02	b,s	1.00E-02	f
CHLOROMETHANE	74873	C	g	1.30E-02	g,r,s	6.30E-03	g,r,s		s		s,t
ETHYLBENZENE	100414	D	b		s,t		s,t	1.00E-01	b,s,t	2.86E-01	b,s,t
METHYLENE CHLORIDE	75092	B2	b	7.50E-03	b,s,t	7.50E-03	f	6.00E-02	b,s,t	8.57E-01	c
TETRACHLOROETHENE	127184	B2	g	5.10E-02	g,s	3.30E-03	i	1.00E-02	b,s,t	1.00E-02	f
TOLUENE	108883	D	b		s,t		s,t	2.00E-01	b,s,t	1.14E-01	b,s,t
TRICHLOROETHENE	79016	B2	g	1.10E-02	g,s	1.70E-02	g,s	1.00E-01	j	1.56E+00	j
VINYL CHLORIDE	75014	A	c	1.90E+00	c,s	3.00E-01	c,s		s,t		s,t
XYLENES	1330207	D	b		s,t		s,t	2.00E+00	b,s,t	2.00E-01	g
SEMI-VOLATILES											
1,2-DICHLOROBENZENE	95501	D	b		s,t		s,t	9.00E-02	b,s,t	4.00E-02	s
1,4-DICHLOROBENZENE	106467	C	c	2.40E-02	c,s	2.40E-02	f	2.10E-03	k,s,t	2.00E-01	c,s,t
2,4-DIMETHYLPHENOL	105679	nr			s,t		s,t	2.00E-02	b,s,t	2.00E-02	f
2-CHLOROPHENOL	95578	nr					s,t	5.00E-03	b,s,t	5.00E-03	f
2-METHYLNAPHTHALENE	91576	nr						4.00E-02	x	4.00E-02	x
2-METHYLPHENOL (o-cresol)	95487	C	b					5.00E-02	b,t	5.00E-02	f
3-METHYPHENOL (m-cresol)	108394	C	t					5.00E-02	t		
4-METHYLPHENOL (p-cresol)	106445	C	b					5.00E-02	b	5.00E-02	f
ACENAPHTHENE	83329	nr			s,t		s,t	6.00E-02	b,s,t	6.00E-02	f
ACENAPHTHYLENE	208968	D	t					4.00E-02	c	4.00E-02	c
ACETOPHENONE	98862	D	b		s,t			1.00E-01	b,s,t	5.00E-06	s,t
ANTHRACENE	120127	nr			s,t			3.00E-01	b,s,t		

TABLE 6.20 Toxicity Data

ANALYTE	CAS #	EPA WOE(a)	Ref.	CANCER POTENCY FACTOR (mg/kg•d)-1 Oral	Ref.	(mg/kg•d)-1 Inhalation	Ref.		RfD (mg/kg•d) Oral	Ref.	RfD (mg/kg•d) Inhalation	Ref.
BENZO(A)ANTHRACENE	56553	B2	b	1.10E+00	d	1.10E+00	f					
BENZO(A)PYRENE	50328	B2	b	7.30E+00	b	7.30E+00	f					
BENZO(B)FLUORANTHENE	205992	B2	l	1.00E+00	d	1.00E+00	f					
BENZO(G,H,I)PERYLENE	191242	D	b						3.00E-02	y	3.00E-02	y
BENZO(K)FLUORANTHENE	207089	B2	b	4.80E-01	d	4.80E-01	f					
BENZOIC ACID	65850	D	b						4.00E+00	b	4.00E+00	f
BIS(2-ETHYLHEXYL)PHTHALATE	117817	B2	b	1.40E-02	b,s,t	1.40E-02	f		2.00E-02	b		
BUTYLBENZYLPHTHALATE, N-	85687	C	b		s		s		2.00E-01	b		
CHRYSENE	218019	B2	b	3.20E-02	s	3.20E-02	f					
DI-N-OCTYLPHTHALATE	117840	nr							2.00E-02	g		
DIBENZ(A,H)ANTHRACENE	53703	B2	b	8.10E+00	d	8.10E+00	f					
DIBENZOFURAN	132649	D	b						4.00E+00	l	4.00E+00	l
DIETHYLPHTHALATE	84662	D	b						8.00E-01	b		
FLUORANTHENE	206440	D	b						4.00E-02	b		
FLUORENE	86737	D	b						4.00E-02	b		
INDENO(1,2,3-CD)PYRENE	193395	B2	b	1.70E+00	d	1.70E+00	f					
NAPHTHALENE	91203	D	b						4.00E-02	c	4.00E-02	f
N-NITROSOPIPERIDINE	100754	B2	p,b	2.10E+00	p,b	2.10E+00	p,b		5.80E-01	e		
PHENANTHRENE	85018	D	b						4.00E-02	m	1.14E-02	m
PHENOL	108952	D	b						6.00E-01	b	6.00E-01	f
PYRENE	129000	D	b						3.00E-02	b	3.00E-02	f
PYRIDINE	110861	nr							1.00E-03	t		
TRICHLOROFLUOROMETHANE	75694	nr							3.00E-01	b	2.00E-01	g
TOTAL PET HYDROCARBONS	no CAS#	nr							2.50E+00	e		
PCB (Aroclor 1254)	1336363	B2	t	7.70E+00	t				7.00E-05	x		
KEROSENE	no CAS#	nr							2.00E-02	z		
PESTICIDES												
4, 4' -DDD	72548	B2	b	2.40E-01	b,s,t	2.40E-01	f		5.00E-04	n		
4, 4' -DDE	72559	B2	t	3.40E-01	t							
4, 4' -DDT	50293	B2	t	3.40E-01	t	3.40E-01	w		5.00E-04	t		
ALDRIN	309002	B2	t	1.70E+01	t				3.00E-05	t		

TABLE 6.20 Toxicity Data

ANALYTE	CAS #	EPA WOE(a)	Ref.	CANCER POTENCY FACTOR (mg/kg•d)-1 Oral	Ref.	(mg/kg•d)-1 Inhalation	Ref.		RfD (mg/kg•d) Oral	Ref.	RfD (mg/kg•d) Inhalation	Ref.
BETA BHC	319857	C	t	1.80E+00	t							
CHLORDANE	57749	B2	t	1.30E+00	t				6.00E-05	t		
DIELDRIN	60571	B2	t	1.60E+01					5.00E-05	t		
HEPTACHLOR EPOXIDE	1024573	B2	t	9.10E+00	t				1.30E+05	t		
HEPTACHLOR	76448	B2	t	4.50E+00	t				5.00E-04	t		
METALS												
ANTIMONY	74400360	nr							4.00E-04	t		
ARSENIC	7440382	A	b	1.75E+00	o,s	5.00E+01	c,q,s,		3.00E-04	b		
BARIUM	7440393	nr							7.00E-02	b	2.90E-05	c
BERYLLIUM	7440417	B2	b	4.30E+00	b,s,t	8.40E+00	c		5.00E-03	b		
CADMIUM	7440439	B1	b			6.10E+00	c		5.00E-04	b		
CHROMIUM VI	18540299	A	b			4.10E+01	c		5.00E-03	b		
COBALT	7440484	nr							1.00E-02	v		
COPPER	7440508	D	b						3.70E-02	g		
FLUORIDE	16984488	nr							6.00E-02	aa		
LEAD	7439921	B2	b						1.00E-04	e,k	4.30E-04	e,u
MANGANESE	7439965	D	b						5.00E-03	s	1.14E-04	b,s
MERCURY	7439976	D	b						3.00E-04	g	8.60E-05	c
MOLYBDENUM	7439987	nr							5.00E-03	b,s,t		
NICKEL (soluble salts)	7440020	nr							2.00E-02	b,s,t		
SILVER	7440224	nr							5.00E-03	t		
TIN	7440315	nr							6.00E-01	g		
VANADIUM	7440622	nr							7.00E-03	c		
ZINC COMPOUNDS	7440666	D	b						3.00E-01	b,r,		

(a) WOE = Weight of Evidence for Carcinogenicity ; A = human carcinogen; B1 or B2 = probable human carcinogen; C = possible human carcinogen; D = not classifiable, (U.S. EPA 1989a).

(b) IRIS Toxicity Database (U.S EPA 1993) ; accessed June 30, 1993.

(c) Health Effects Assessment Summary Tables, Annual 1992 (U.S. EPA 1992a).

(d) Relative Potency Estimates (RPE) for polynuclear aromatic hydrocarbons (ICF-Clement Associates 1988).

(e) RfD derived by T.T. Jarvis and M. F. Jarvis, 1993.

(f) Oral value adopted as inhalation value.

(g) Health Effects Assessment Summary Tables, Annual 1991(U.S. EPA 1991d).

TABLE 6.20 Toxicity Data

ANALYTE	CAS #	EPA WOE(a)	Ref.	CANCER POTENCY FACTOR (mg/kg•d)-1 Oral	Ref.	CANCER POTENCY FACTOR (mg/kg•d)-1 Inhalation	Ref.	RfD (mg/kg•d) Oral	Ref.	RfD (mg/kg•d) Inhalation	Ref.
(h) Cancer potency factor assumed same as 1,1-Dichloroethene (CAS 75354).											
(i) Health Effects Assessment Summary Tables, Annual 1990 (U.S. EPA 1990).											
(j) Toxicological Profile for Trichloroethylene (U.S. PHS 1988).											
(k) Derived from MCL or MCLG.											
(l) RfD value of Benzoic Acid used as surrogate.											
(m) RfD value for Fluoranthene used as surrogate.											
(n) RfD value for DDT used as surrogate (U.S. EPA 1993).											
(o) IRIS Toxicity Database , as reported in 1991 (U.S. EPA 1993).											
(p) N-Nitrosopyrrolidine used as surrogate (CAS# 930552).											
(q) Health Effects Assessment Summary Tables, Annual 1993 (U.S. EPA 1993)											
(r) Health Effects Assessment Summary Tables, Annual 1993, Supplement (U.S. EPA 1993)											
(s) State of Washington, Department of Ecology (DOE), Update to the Model Toxics Control Act Cleanup Standards Database,											
(s) July 9, 1993 (DOE 1993).											
(t) IRIS Toxicity Database (U.S. EPA 1994); accessed January 1994.											
(u) Derived from EPA Clean Air Act, NAAQS.											
(v) RfD from: Drinking Water and Health, National Research Council, 1983.											
(w) Washington State Air Toxics Regulations, 1993.											
(x) RfD and RfC values for naphthalene (CAS# 91203) used as surrogate.											
(y) RfD and RfC values for pyrene (CAS# 129000) used as surrogate.											
(z) U.S. EPA, 1992b											
(aa) RfD value for fluorine (CAS# 7782414) used as surrogate.											
Toxicity category not applicable =											
nr = Not Rated											

factors have been applied (e.g., to account for the use of animal data to predict effects on humans).

No EPA toxicity data exist for TPHs. Thus, TPH was not carried through the risk calculations. The components of TPH (e.g., benzene, toluene, ethylbenzene, and xylenes, and napthalenes) are included in the risk calculations. Other chemicals not carried through the risk calculations included metals which had values less than background.

6.1.4 Risk Characterization (Current and Future)

The exposure point concentrations for each source area (Tables 6.2 through 6.19) were used with the toxicity data (Table 6.20) to calculate the risks for carcinogens and noncarcinogens at each of the OU1 source areas.

For carcinogens, risks were estimated as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to the carcinogen. Excess lifetime cancer risk was calculated from the following equation:

$$\text{Risk} = \text{CDI} \times \text{SF}$$

where:

Risk = a unitless probability (e.g., 2×10^{-5}) of an individual developing cancer.
CDI = chronic daily intake average over 70 years (mg/kg-day).
SF = slope factor $(\text{mg/kg-day})^{-1}$.

These risks are probabilities that are generally expressed in scientific notation (e.g., 1×10^{-6} or 1E-6). An excess lifetime cancer risk of 1×10^{-6} indicates that, as a reasonable maximum estimate, an individual has a 1 in 1,000,000 chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year lifetime under the specific exposure conditions at a source area.

For noncarcinogens, the potential effects were evaluated by comparing an exposure level over a specified time period (e.g., lifetime) with a reference dose derived for a similar exposure period. The ratio of exposure to toxicity is called a hazard quotient (HQ). By adding the HQs for all contaminants of concern within a medium or across all media to which a given population may reasonably be exposed, the hazard index (HI) can be generated. The HQ is calculated as follows:

$$\text{Noncancer HQ} = \text{CDI/RfD}$$

where:

CDI = chronic daily intake.
RfD = reference dose.

CDI and RfD are expressed in the same units and represent the same exposure period (i.e., chronic, subchronic, or short term).

Risk calculations were made for each of the three land-use scenarios, all associated exposure pathways, and for two different exposure cases--average exposure and reasonable maximum exposure.

Tables 6.21 through 6.26 summarize by source area the risk calculation results. Each table lists the cancer risk and the HI for each exposure pathway individually. The values presented are for the reasonable maximum exposure case only. A total cancer risk value and a total HI are presented that add all of the exposure pathway risks together.

Table 6.21. Summary of Cancer Risk and Hazard Index for the Reasonable Maximum Exposure Case, ST20 E-7 Complex

Exposure Pathway	Land-Use Scenario					
	Current Industrial		Future Industrial		Future Residential	
	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index
Ingestion of groundwater	N/A	N/A	6.1E-04	1.1	2.0E-03	3.1
Dermal contact during groundwater use	N/A	N/A	1.1E-03	10	1.7E-03	15
Inhalation of volatiles during groundwater use	N/A	N/A	4.5E-03	1,300	7.6E-03	1,800
Ingestion of surface soils	2.6E-07	0.0	2.6E-07	0.0	2.1E-06	0.0
Dermal contact with surface soils	2.6E-08	0.0	2.6E-08	0.0	6.0E-08	0.0
Ingestion of subsurface soils	2.0E-08	0.0	2.0E-08	0.0	9.5E-07	0.0
Dermal contact with subsurface soils	1.0E-08	0.0	1.0E-08	0.0	1.1E-07	0.0
Inhalation of volatiles from soils	0.0E+00	0.0	0.0E+00	0.0	00E+00	0.0
Inhalation of resuspended particulates from soil	4.4E-11	0.0	4.4E-11	0.0	6.6E-11	0.0
Ingestion of plants	N/A	N/A	N/A	N/A	5.7E-07	0.02
Summation for all exposure pathways	3.2E-07	0.0	6.2E-03	1,311	1.1E-02	1,818

N/A = not analyzed because the pathway was not considered complete under this land-use scenario.
NOTE: Metals are not included.

Table 6.22. Summary of Cancer Risk and Hazard Index for the Reasonable Maximum Exposure Case, ST20 E-8 Complex

Exposure Pathway	Land-Use Scenario					
	Current Industrial		Future Industrial		Future Residential	
	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index
Ingestion of groundwater	N/A	N/A	4.6E-05	0.11	1.6E-04	0.30
Dermal contact during groundwater use	N/A	N/A	5.9E-05	1.1	10E-05	1.6
Inhalation of volatiles during groundwater use	N/A	N/A	3.5E-04	1.7	5.8E-04	2.4
Ingestion of surface soils	0.0E+00	0.0	0.0E+00	0.0	0.0E+00	0.0
Dermal contact with surface soils	0.0E+00	0.0	0.0E+00	0.0	0.0E+00	0.0
Ingestion of subsurface soils	1.3E-07	0.0	1.3E-07	0.0	6.3E-06	0.0
Dermal contact with subsurface soils	1.3E-07	0.0	1.3E-07	0.0	1.4E-06	0.0
Inhalation of volatiles from soils	0.0E+00	0.0	0.0E+00	0.0	0.0E+00	0.0
Inhalation of resuspended particulates from soil	0.0E+00	0.0	0.0E+00	0.0	0.0E+00	0.0
Ingestion of plants	N/A	N/A	N/A	N/A	0.0E+00	0.0
Summation for all exposure pathways	2.6E-07	0.0	4.5E-04	2.9	8.5E-04	4.3

N/A = not analyzed because the pathway was not considered complete under this land-use scenario.
NOTE: Metals are not included.

Table 6.23. Summary of Cancer Risk and Hazard Index for the Maximum Exposure Case, ST20 E-9 Complex

Exposure Pathway	Land-Use Scenario					
	Current Industrial		Future Industrial		Future Residential	
	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index
Ingestion of groundwater	N/A	N/A	1.2E-03	0.69	3.9E-03	2.0
Dermal contact during groundwater use	N/A	N/A	1.5E-03	7.3	2.5E-03	10
Inhalation of volatiles during groundwater use	N/A	N/A	8.8E-03	8.3	1.5E-02	12
Ingestion of surface soils	9.1E-07	0.0	9.1E-07	0.0	6.6E-06	0.0
Dermal contact with surface soils	9.1E-07	0.0	9.1E-07	0.0	2.1E-06	0.0
Ingestion of subsurface soils	4.7E-07	0.0	4.7E-07	0.0	4.9E-06	0.0
Dermal contact with subsurface soils	4.7E-07	0.0	4.7E-07	0.0	1.4E-07	0.0
Inhalation of volatiles from soils	6.0E-09	0.0	6.0E-09	0.0	6.0E-09	0.0
Inhalation of resuspended particulates from soil	7.8E-11	0.0	7.8E-11	0.0	1.2E-10	0.0
Ingestion of plants	N/A	N/A	N/A	N/A	1.4E-05	0.0
Summation for all exposure pathways	2.7E-06	0.0	1.2E-02	16	2.1E-02	24

N/A = not analyzed because the pathway was not considered complete under this land-use scenario.
NOTE: Metals are not included.

Table 6.24. Summary of Cancer Risk and Hazard Index for the Reasonable Maximum Exposure Case, ST48

Exposure Pathway	Land-Use Scenario					
	Current Industrial		Future Industrial		Future Residential	
	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index
Ingestion of groundwater	N/A	N/A	2.7E-04	1.4	9.0E-04	3.8
Dermal contact during groundwater use	N/A	N/A	3.4E-04	2.6	5.8E-04	3.7
Inhalation of volatiles during groundwater use	N/A	N/A	2.0E-03	4.1	3.4E-03	5.8
Ingestion of surface soils	1.2E-06	0.02	1.2E-06	0.02	9.2E-06	0.15
Dermal contact with surface soils	1.0E-06	0.0	1.0E-06	0.0	2.5E-07	0.01
Ingestion of subsurface soils	2.2E-07	0.0	2.2E-07	0.0	1.0E-05	0.08
Dermal contact with subsurface soils	2.2E-08	0.0	2.2E-08	0.0	2.3E-06	0.01
Inhalation of volatiles from soils	8.1E-09	0.0	8.1E-09	0.0	8.1E-09	0.0
Inhalation of resuspended particulates from soil	1.2E-10	0.0	1.2E-10	0.0	1.7E-10	0.0
Ingestion of plants	N/A	N/A	N/A	N/A	1.6E-05	0.07
Summation for all exposure pathways	2.4E-06	0.02	2.6E-03	8.2	4.9E-03	14

N/A = not analyzed because the pathway was not considered complete under this land-use scenario.
NOTE: Metals are not included.

Table 6.25. Summary of Cancer Risk and Hazard Index for the Maximum Exposure Case, ST49

Exposure Pathway	Land-Use Scenario					
	Current Industrial		Future Industrial		Future Residential	
	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index
Ingestion of groundwater	N/A	N/A	1.4E-06	0.19	4.7E-06	0.55
Dermal contact during groundwater use	N/A	N/A	4.1E-05	0.0	6.8E-05	0.0
Inhalation of volatiles during groundwater use	N/A	N/A	1.2E-05	0.0	2.0E-05	0.0
Ingestion of surface soils	4.4E-07	0.01	4.4E-07	0.01	3.4E-06	0.08
Dermal contact with surface soils	4.4E-07	0.01	4.4E-07	0.01	9.9E-07	0.02
Ingestion of subsurface soils	7.7E-10	0.0	7.7E-10	0.0	3.7E-08	0.0
Dermal contact with subsurface soils	7.7E-10	0.0	7.7E-10	0.0	8.0E-09	0.0
Inhalation of volatiles from soils	3.4E-08	0.0	3.4E-08	0.0	3.4E-08	0.0
Inhalation of resuspended particulates from soil	1.3E-11	0.0	1.3E-11	0.0	1.9E-11	0.0
Ingestion of plants	N/A	N/A	N/A	N/A	4.3E-05	0.72
Summation for all exposure pathways	9.1E-07	0.02	5.5E-05	0.21	1.4E-04	1.4

N/A = not analyzed because the pathway was not considered complete under this land-use scenario.
NOTE: Metals are not included.

Table 6.26. Summary of Cancer Risk and Hazard Index for the Reasonable Maximum Exposure Case, Blair Lakes

Exposure Pathway	Land-Use Scenario					
	Current Industrial		Future Industrial		Future Residential	
	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index
Ingestion of groundwater	N/A	N/A	2.4E-05 (5.2E-04)	3.1 (63.24)	8.1E-05 (1.7E-03)	8.6 (177)
Dermal contact during groundwater use	N/A	N/A	2.8E-05 (2.9E-05)	3.6 (3.8)	4.6E-05 (4.9E-05)	5.1 (5.3)
Inhalation of volatiles during groundwater use	N/A	N/A	1.7E-04 (1.7E-04)	2.4 (2.4)	2.9E-04 (2.9E-04)	3.3 (3.3)
Ingestion of surface soils	1.0E-08 (1.5E-06)	0.0 (0.06)	1.0E-08 (1.5E-06)	0.0 (0.06)	8.1E-08 (1.2E-05)	0.0 (0.41)
Dermal contact with surface soils	1.0E-08 (1.6E-07)	0.0 (0.01)	1.0E-08 (1.6E-07)	0.0 (0.01)	2.3E-08 (3.7E-07)	0.0 (0.01)
Ingestion of subsurface soils	1.4E-09 (5.7E-07)	0.0 (0.01)	1.4E-09 (5.7E-07)	0.0 (0.01)	6.5E-08 (2.8E-05)	0.0 (0.58)
Dermal contact with subsurface soils	1.4E-09 (5.9E-08)	0.0 (0.0)	1.4E-09 (5.9E-08)	0.0 (0.0)	1.4E-08 (6.1E-07)	0.0 (0.01)
Inhalation of volatiles from soils	4.0E-07 (4.3E-07)	0.0 (0.0)	4.0E-07 (4.0E-07)	0.0 (0.0)	4.0E-07 (4.0E-07)	0.0 (0.0)
Inhalation of resuspended particulates from soil	8.9E-13 (1.1E-08)	0.0 (0.0)	8.9E-13 (1.1E-08)	0.0 (0.0)	1.3E-12 (1.6E-08)	0.0 (0.0)
Ingestion of plants	N/A	N/A	N/A	N/A	2.7E-05 (3.8E-05)	0.0 (4.1)
Summation for all exposure pathways	4.3E-07	0.0	2.2E-04	9.1	4.4E-04	17

N/A = not analyzed because the pathway was not considered complete under this land-use scenario.
NOTE: Values in parentheses are the respective cancer risk and hazard index when detected metals are included as site contaminants.
NOTE: Metals are not included.

The summation for all exposure pathways excludes the contribution from potential background metals. Some areas of Fairbanks, Alaska, are noted for elevated concentrations of metals, in particular iron, manganese, and arsenic in the groundwater (Cederstrom 1963; Nelson 1978; Krumhart 1982; Weddleton et al. 1989). These metals and several others including antimony, arsenic, beryllium, cadmium, and manganese were found to occur at elevated concentrations at OU1. Many of these metals exceed risk-based screening concentrations, and background samples for both soil and groundwater were collected to help identify which metals could be considered equivalent to site background and not the result of base activities.

A risk for metals that exceeded the screening criteria were determined and presented in Appendix A of the OU1 baseline risk assessment (U.S. Air Force 1994b). These risks, however, were not carried through to the summary risk tables, because either the metals did not exceed background for metals at the base, there were no EPA toxicity values established (lead), or there was no identifiable anthropogenic source for the metal (manganese). At the remote Blair Lakes Target Facility, background metals were established for the soils, but not for the groundwater because no upgradient background wells were available. No

background data exist for several metals. Section E.3 of the OU2 baseline risk assessment (U.S. Air Force 1993b) discusses metal concentrations in groundwater for which no background data exist. No background data exist for surface waters.

Because risk assessments were performed on six sets of source areas at OU1, this record of decision does not present quantified carcinogenic risks and HQs for each contaminant of concern in each exposure medium for each exposure pathway. Appendix A of the OU1 baseline risk assessment (U.S. Air Force 1994b) summarizes these data.

The major contributors to risk by source area and media are summarized in table 6.27. The major contributors targeted for cleanup for both soil and groundwater are the BTEX compounds (benzene, ethylbenzene, toluene, and xylenes). Following is a brief summary of the risks associated with each source area.

ST20 (E-7, E-8, and E-9 Complexes) Refueling Loop

Tables 6.21, 6.22, and 6.23 indicate that excess cancer risk to human health in the future residential land-use scenarios present an unacceptable risk (greater than 1 in 10,000) at ST20 (E-7, E-8, and E-9 Complexes). Furthermore, the HI is greater than 1 in each site. Based on these estimates, the primary exposure pathway of concern for the sites in ST20 under all land-use scenarios is the prolonged contact, consumption, and inhalation of vapor from contaminated groundwater.

The contaminants of concern in groundwater are primarily BTEX. Contaminants of concern which are not targeted for cleanup because they were detected in one sample from one location include acetophenone in groundwater at E-7 and vinyl chloride in soil and chlorobenzene in groundwater at E-9. Additional samples will be collected during the remedial design for OU1 to verify that these chemicals are not present. 2-methylphenol and 4-methylphenol in the groundwater at E-7 are not targeted for cleanup because their contribution to risk is low and their removal will not significantly impact the risk level at this site. Contamination of subsurface soil (in the smear zone) also presents a future risk by leaching of hazardous constituents into groundwater at each of the sites in ST20 (E-7, E-8, and E-9 Complexes).

ST48 Power Plant

At ST48 (Table 6.24) an excess cancer risk to human health in a future residential land-use scenario presents an unacceptable risk (greater than 1 in 10,000). Furthermore, the HI is greater than 1. Based on these estimates, the primary exposure pathway of concern for the sites in ST48 under all land-use scenarios is the prolonged contact, consumption, and inhalation of vapor from contaminated groundwater.

Table 6.27 Major Contributors to Risk by Source Area and Media

Source Area	Contaminants by Media	
	Soils[a]	Groundwater
ST20 E-7 Complex	Benzene Toluene Ethylbenzene Xylenes	Benzene Toluene Ethylbenzene Xylenes --- Acetophenone[c] 2-methylphenol[d] 4-methylphenol[d]
ST20 E-8 Complex	Benzene Toluene Ethylbenzene Xylenes	Benzene Toluene Xylenes
ST20 E-9 Complex	Benzene Toluene Ethylbenzene Xylenes --- Vinyl chloride[c]	Benzene Toluene Ethylbenzene Xylenes --- Chlorobenzene[c]
ST48	Benzene Toluene Ethylbenzene Xylenes	Benzene Toluene Xylenes --- trans-1,2-dichloroethylene[c] Tetrachloroethene[d]
ST49	Chlordane[e] Dieldrin[e]	--
Blair Lakes[b]	Benzene Toluene Ethylbenzene Xylenes	Benzene Toluene Ethylbenzene Xylenes --- Chloromethane[d] 2-methylnaphthalene[d]

[a]Including fuel saturated soils in the smear zone.
[b]Blair Lakes is SS50, SS51, SS52, SS53, and DP54.
[c]Contaminant Detected Infrequently. Will be monitored to verify absence.
[d]Contribution to risk low. Targeting these chemicals will not significantly impact risk level.
[e]The cumulative risk for ST49 is within the acceptable risk range; therefore, no additional monitoring for these compounds will occur.

The contaminants of concern in groundwater are BTEX and the chlorinated solvents, tetrachloroethene and trans-1,2-dichloroethylene. Trans-1,2-dichloroethylene in the groundwater is not targeted for cleanup because it was detected in one sample from one location. Additional samples will be collected during the remedial design for OU1 to verify that this chemical is not present. Tetrachloroethene in the groundwater is not targeted for cleanup because its contribution to risk is low. Removal of this chemical will not significantly impact the risk level at this site. Benzene, ethylbenzene, and toluene contamination of subsurface soil may also present a future risk to groundwater.

ST49 Alert Hanger

The only exposure pathway of potential concern for ST49 is the consumption and use of contaminated groundwater (Table 6.25). The cumulative risk from all potential pathways does not present an unacceptable risk. Contaminants of concern at this source area are residual amounts of chlordane and dieldrin in the sediments and surface soil at locations upgradient and downgradient of the source area proper. These chemicals are the byproducts of the breakdown of pesticides which are widespread and the result of past basewide spraying. The pesticides were evaluated in the risk assessment and were within acceptable risk ranges.

SS50, SS51, SS52, SS53, and DP54 Blair Lakes

At Blair Lakes (SS50, SS51, and SS52) an excess cancer risk to human health in a future residential land-use scenario presents an unacceptable risk (greater than 1 in 10,000). Furthermore, the HI is greater than 1 (Table 6.26). Based on these estimates, the primary exposure pathway of concern for the source areas at Blair Lakes under all land-use scenarios is the prolonged contact, consumption, and use of contaminated groundwater. Chloromethane and 2-methylnapthalene in the groundwater are not targeted for cleanup because their contribution to risk is low and their removal will not significantly impact the risk level at this site.

No risk assessment was performed on SS53 and DP54 because the concentration of the contaminants at these source areas were below risk-based screening concentrations.

6.1.5 Uncertainty

Health risk assessment methodology has inherent uncertainty associated with how accurately the calculated risk estimates represent the actual risk. The effects of the assumptions and the uncertainty factors may not be known. Usually, the effect is difficult to quantify numerically (e.g., in terms of an error bar). As a result, the effect is discussed qualitatively. Some of the assumptions and uncertainty factors associated with the baseline risk assessment include the following.

- This assessment used EPA Region 10 default exposure parameters for most calculations. Some of these parameters are not realistic for a subarctic climate (may overestimate risk).

- Existing concentrations are assumed to be the concentrations or exposure source terms in the future. No reduction from natural degradation and attenuation over time is taken into account. No increase because of additional contamination is assumed. Potential degradation products of existing organic contaminants (e.g., benzene) are not considered (may overestimate or under estimate risk).

- The groundwater detection limits for some organic and inorganic contaminants, especially PAHs, are higher than risk-based screening concentrations (may underestimate risk).

- Most sampling at the OU1 source areas was conducted during the late spring. Seasonal changes may impact soils and groundwater contamination (may overestimate or underestimate risk).

- Risk values calculated for lead in groundwater were based on unfiltered samples of groundwater. Lead values from unfiltered samples reflect in part the sediment fraction of lead dissolved by acid preservatives used during sampling. All samples filtered before contact with acid preservatives were below action levels.

- The natural background concentrations of metals in the Blair Lakes area groundwater is not known with certainty. The sediments in the area are known to be highly mineralized. Because no source of metals contamination is evident, the summary risk numbers do not include metals. However, risks for metals are presented in Appendix A of the OU1 baseline risk assessment.

- Surface soil samples were composited from three to five locations. They may have missed hot spots of surface contamination (may underestimate risk).

- Comprehensive soil analyses were analyzed where TPH was most concentrated. This analysis may not have been the most representative of volatile and semivolatile contamination (may underestimate risk).

6.2 Environmental Risks

No acute ecological hazards were identified at OU1 and these areas do not appear to be acting as a source of surface water or sediment contamination. Pesticides were detected in the sediment and surface soil near Garrison Slough at locations both upgradient and downgradient of ST49, which is near the slough. The pesticides are believed to be residual concentrations from previous base activities and are not directly related to ST49. Cumulative contaminant concentrations basewide from past releases are being reviewed under the sitewide OU.

7.0 Description of Alternatives

A feasibility study (FS) was performed as part of the OU1 RI/FS process. This section of the record of decision describes the remedial alternatives proposed in the FS. For more details, see the FS (U.S. Air Force 1994c).

7.1 Remedial Action Objectives

Remedial action objectives (RAOs) are developed to specify actions and contaminant levels necessary to protect human health and the environment. RAOs define the contaminants of concern, exposure routes and receptors, and remediation goals, which are defined as an acceptable contaminant level for each exposure route. The RAOs for the OU1 source areas are summarized in Table 7.1. The results of the baseline risk assessment (U.S. Air Force 1994b) are used to determine the potential for current or future risk from a given source area and to identify acceptable contaminant levels for each exposure pathway. Health-based applicable or relevant and appropriate requirements (ARARs) are also used to establish remediation goals

Table 7.1. Remedial Action Objectives for Environmental Media

Environmental Media	Remedial Action Objectives
Groundwater	
For Human Health	
	Prevent use of water having carcinogens (benzene) in excess of MCLs
	Prevent use of water having noncarcinogens (toluene, ethylbenzene, xylenes, naphthalenes, total lead) in excess of MCLs or reference doses
For Environmental Protection	
	Restore aquifer to its designated beneficial use as a drinking water source
Soil	
For Environmental Protection	
	Prevent migration of contaminants that would result in groundwater contamination in excess of MCLs or health-based levels

MCL = maximum contaminant level

when they are available. In addition, groundwater concentrations are compared to drinking water standards as specified by EPA's groundwater protection strategy. The goal of EPA's

Superfund approach is to return usable groundwaters to their beneficial uses within a timeframe that is reasonable given the particular circumstances of the source area.

To achieve these objectives, remediation goals (Table 7.2) that identify acceptable BTEX levels in soils and groundwater have been developed from risk-based concentrations and chemical-specific ARARs. The primary RAO is protection of groundwater. The secondary remediation goals developed for soil are based on fate and transport modeling and may be modified if additional information indicates that an alternative level of soil remediation protects groundwater.

Table 7.2. Final Remediation Goals

Constituent	Groundwater (µg/L)	Soil and Shallow Sediments (mg/kg)
Benzene	5[a]	0.2[b]
Toluene	1,000[a]	80[b]
Ethylbenzene	700[a]	140[b]
Xylenes	10,000[a]	760[b]

[a]Based on chemical-specific applicable or relevant and appropriate requirements.
[b]Based on leaching to groundwater (Appendix D of U.S. Air Force 1994c).

7.1.1 Source Area ST20 (E-7, E-8, and E-9 Complexes)

Based on findings of the remedial investigation and baseline risk assessment, the E-7, E-8, and E-9 Complexes require remedial action because of the potential risk from unrestricted domestic use of groundwater. These source areas are characterized by petroleum-derived contaminants (BTEX) in the soil and groundwater, and floating fuel in the smear zone at the top of the water table. The potential risks are primarily associated with BTEX in the groundwater. The soils do not pose an unacceptable risk because of ingestion or dermal contact under either the current industrial or future residential scenarios. However, residual contamination in the soil and smear zone may be a continuing source of releases to the groundwater, and, therefore, may also contribute to the potential risk.

7.1.2 Source Area ST48

Based on findings of the remedial investigation and the baseline risk assessment, ST48 requires remedial action because of the potential risk from unrestricted domestic use of groundwater. ST48 is characterized by petroleum-derived contaminants (BTEX) in the soil and groundwater, and floating fuel in the smear zone at the top of the water table. The potential risks are primarily associated with BTEX in the groundwater. The soils do not pose an

unacceptable risk because of ingestion or dermal contact under either the current industrial or future residential scenarios. However, residual contamination in the soil and smear zone may be a continuing source of releases to the groundwater, and, therefore, may also contribute to the potential risk.

7.1.3 Source Area ST49

For ST49, the cumulative risk from all current and future potential pathways is within acceptable regulatory levels. However, groundwater concentrations exceeded the MCL for benzene in one well by approximately 3 µg/L in 1993. Wells surrounding ST49 contained benzene below the 5 µg/L MCL. Soil and groundwater concentrations are protective of human health and the environment and, therefore, no remedial action is required at ST49.

Although no action is required under CERCLA, the U.S. Air Force will remove the tanks at ST49 as part of the Underground Storage Tank Program. The U.S. Air Force will also continue to monitor groundwater for a minimum of 5 years to ensure protection of human health and the environment. Monitoring data will be resolved after 5 years to determine if monitoring should continue.

7.1.4 Source Areas SS50, SS51, SS52, SS53, and DP54

Based on findings of the remedial investigation and the baseline risk assessment, SS50, SS51, and SS52 require remedial action because of the potential risk from unrestricted domestic use of groundwater. These source areas are characterized by petroleum-derived contaminants (BTEX) in the soil and groundwater, and floating fuel in the smear zone at the top of the water table. The potential risks are primarily associated with BTEX in the groundwater. The soils do not pose an unacceptable risk because of ingestion or dermal contact under either the current industrial or future residential scenarios. However, residual contamination in the soil and smear zone may be a continuing source of releases to the groundwater, and, therefore, may also contribute to the potential risk.

Additional remedial investigations will also be conducted near well 50M05 where an unidentified source of contamination appears to be releasing BTEX to the groundwater. Soil and groundwater sampling will be conducted to identify the source of contamination.

SS53

No indication exists of surface contamination left from the original fuel spill, and a very small amount of fuel contamination remains in the groundwater, below regulatory limits. The cumulative risk from all current and future potential pathways is within acceptable regulatory levels. Soil and groundwater concentrations are protective of human health and the environment and, therefore, no remedial action is required at SS53.

DP54

Extensive characterization of DP54 indicates that no buried drums exist, as an original anecdotal report indicated. This source area does not contribute additional health risks to humans or the environment.

7.2 Remedial Alternatives

Four alternatives were developed in the FS and analyzed in detail. Three of these alternatives were considered for implementation and presented in the Proposed Plan. The alternative that was not carried through was groundwater containment alternative. After consideration, it was determined that the containment alternative was not a feasible alternative because the volume of water that would have to be pumped to establish containment was too large. This alternative is nearly identical to the in situ alternative with the addition of groundwater containment through pumping. The three alternatives are described in Sections 7.2.1 through 7.2.3. ARARs for each alternative are summarized in Table 7.3.

7.2.1 Alternative 1: No Action Alternative

Under this alternative, no action would be taken to remove the floating fuel or remediate contaminated soils or groundwater. No monitoring of soil or groundwater would be conducted. This alternative is required under the National Contingency Plan and provides the baseline against which the other alternatives are compared.

7.2.2 Alternative 2: In Situ Alternative

This alternative addresses groundwater contamination by source reduction in the subsurface and smear zone soils.

This alternative may employ passive skimming devices where free product is sufficiently mobile to flow, without an induced gradient, into wells and trenches. This alternative will also utilize a bioventing/soil vapor extraction system to enhance bioremediation and volatilization of petroleum contamination in the vadose zone and smear zone. The system may be operated in the air injection or air withdrawal mode with wells installed from below ground surface to several feet below the water table as needed to effectively remove petroleum contamination from the subsurface and smear zone soils. Although air emission controls will be installed on the system if needed, the system will be designed and operated to minimize the need for air emission controls.

The frequency of switching between air withdrawal and air injection will be determined during remedial design/remedial action. Since both systems will use the same plumbing systems, switching between air injection and air withdrawal will be readily implementable. Passive or active heating of the soil will be an option to enhance biodegradation, if appropriate.

Table 7.3. Relationship Between Applicable or Relevant and Appropriate Requirements and Alternatives

Applicable or Relevant and Appropriate Requirements	Applicable Regulations and Codes	Remedial Alternatives		
		1	2	3
Action-Specific				
Alaska Solid Waste Management	18 AAC 60		A	A
Alaska Hazardous Waste Regulations	18 AAC 62		A	A
RCRA Land Disposal Restrictions	40 CFR 268		A	A
RCRA Waste Piles Regulations	40 CFR 264.251		A	A
Federal Clean Air Act	42 USC 7401		A	A
AWQC and Alaska Discharge Standards	AWQC §304/18 AAC 70		A	A
Chemical-Specific				
MCL, non-zero MCLGs, and Action Levels	40 CFR 141/18 AAC 80		R	R
Alaska Water Quality Standards	18 AAC 70		A	A
Alaska Oil Pollution Regulations	18 AAC 75		A	A
Alaska Regulations for Leaking Underground Storage Tanks	18 AAC 78		R	R

A = applicable.
AWQC = Alaska Water Quality Control.
MCL = maximum contaminant level.
MCLG = maximum contaminant level goal.
R = relevant and appropriate.
RCRA = *Resource Conservation and Recovery Act.*

Exposures to contaminated groundwater will be prevented through institutional controls. Institutional land use controls will be designed to prevent exposure to contaminated groundwater and will involve prohibiting the installation and use of any well for drinking water that could extract contaminated groundwater or affect the movement of contaminated groundwater. To ensure long-term integrity of the above land use controls, the Air Force will ensure that, to the extent that groundwater contamination remains above unacceptable levels, deed restrictions or equivalent safeguards will be implemented in the event that property containing such contamination is transferred by the Air Force. Institutional controls prohibiting domestic use of groundwater within the contaminated area will remain in place for as long as the contaminant concentrations in groundwater exceed MCLs. Drinking water will continue to be supplied to the area from the main base water supply system. Groundwater monitoring will be conducted to evaluate contaminant migration and compliance with final remediation goals.

7.2.3 Alternative 3: Removal Alternative

This alternative removes known subsurface soil hotspots to the extent practicable. Unsaturated soils (vadose and upper portion of the smear zone) that exceed the final remediation goals for protection of groundwater would be excavated where feasible without disrupting base activities and use of facilities. Because the source areas are adjacent to fuel outlets, above-ground and below-ground storage tanks, pipelines, buildings, and other facilities, only a small portion of the soil contaminated above final remediation goals may actually be excavated. The excavated soils could be treated by ex situ bioremediation (e.g., composting).

Also, this alternative would install product and groundwater extraction wells with dual-phase active skimmer pumps to remove the floating fuel and contaminated groundwater. The use of dual-phase pumps would create a small localized cone of depression in the water table, enhancing free phase fuel flow to the skimming wells. The effectiveness of active skimming will be evaluated before full-scale implementation. The extracted groundwater would be treated by air stripping and carbon adsorption to remove the VOCs. Pretreatment to remove metals may be required to prevent equipment fouling and to meet discharge limits. Air pollution controls would be installed if needed to protect of human health or comply with ARARs.

This alternative addresses groundwater contamination by extraction and treatment. It does include active remediation of the floating product and the smear zone soils where they are accessible. A significant volume of soils may not be accessible for excavation.

Exposures to contaminated groundwater will be prevented through institutional controls. Institutional land use controls will be designed to prevent exposure to contaminated groundwater and will involve prohibiting the installation and use of any well for drinking water that could extract contaminated groundwater or affect the movement of contaminated groundwater. Site maps will be developed showing areas currently and potentially impacted by groundwater contaminants. This information can be referenced during base permitting procedures. To ensure long-term integrity of the above land use controls, the Air Force will ensure that, to the extent that groundwater contamination remains above unacceptable levels, deed restrictions or equivalent safeguards will be implemented in the event that property containing such contamination is transferred by the Air Force. Institutional controls prohibiting domestic use of groundwater within the contaminated area would remain in place for as long as the contaminant concentrations in groundwater exceed MCLs. Drinking water would continue to be supplied to the area from the main base water supply system. Groundwater monitoring would be conducted to evaluate contaminant migration and compliance with final remediation goals.

8.0 Summary of the Comparative Analysis of Alternatives

In accordance with federal regulations, the three cleanup alternatives were evaluated based on the nine criteria presented in the National Contingency Plan. The results of this evaluation are discussed in this section and depicted in Table 8.1.

8.1 Overall Protection of Human Health and the Environment

All of the alternatives, except alternative 1, would use institutional controls to prevent the use of contaminated groundwater until cleanup standards are achieved. Alternative 2 would provide the greatest protection and degree of cleanup by treating petroleum contamination in the soils and protecting against future groundwater contamination. Alternative 3 would provide limited protection by treating some of the soil contamination and partially reducing the source of groundwater contamination by active groundwater treatment. Alternative 2 does not treat current groundwater contamination but focuses on removal of its source and thus prevents future groundwater contamination. Alternative 3 includes removal of soil hot spots but focuses on groundwater treatment to effect site cleanup. Alternative 2 addresses the contamination before it has a chance to spread further while alternative 3 requires the contamination to dissolve into the groundwater where it is removed by pumping and then treated above ground.

Table 8.1. Criteria for Comparison of Alternatives

Evaluation Criteria	Ranking		
	Alternative 1	Alternative 2	Alternative 3
Long-term Effectiveness and Permanence	Worst	Good	Good
Reduction of Toxicity, Mobility, and Volume	Worst	Best	Poor
Short-term Effectiveness	Worst	Good	Good
Implementability	Best	Good	Poor
Cost	Best	Good	Poor

8.2 Compliance with Applicable or Relevant and Appropriate Requirements

Alternative 2 would be expected to achieve groundwater cleanup standards more rapidly than the other alternatives, although alternatives 1, 2, and 3 all rely on natural processes to slowly decrease petroleum concentrations in the groundwater.

Alternatives 2 and 3 would be designed and implemented to meet all state and federal ARARs, including air emission limitations, surface water discharge limits, and disposal of byproducts from the groundwater treatment activities.

8.3 Long-Term Effectiveness and Permanence

Alternatives 2 and 3 rank equally with respect to long-term effectiveness and permanence. Alternative 2 would address sub-surface soils, including the smear-zone soils on top of the groundwater. Therefore, alternative 2 would achieve the best treatment of soils that are continuing to contaminate the groundwater before those contaminants are leached into the groundwater.

Alternative 3 includes selective excavation of soils, but large volumes of contaminated soils could not be excavated because of the presence of pipelines, tanks, and operating systems in the area. Alternative 3 addresses contamination in the smear-zone soils by relying on those contaminants leaching into the groundwater where they would be extracted and treated above ground. Over the long term, alternatives 2 and 3 would both reduce the magnitude of residual risk; however, alternative 2 is anticipated to be completed more quickly than alternative 3.

8.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

Alternative 2 would result in the greatest reduction in toxicity, mobility, and volume of contamination by treating contamination in the soil and smear zone above the groundwater before it has a chance to spread into the groundwater. Alternative 3 is less effective in reducing contaminant mass than alternative 2 because it depends on the spreading of contaminants into the groundwater before they can be treated. The recovery of the dispersed mass of contaminants in alternative 3 will be lower than if the contamination could be treated before it spread. Both alternatives include treatments that are irreversible. The residual contamination remaining after treatment would be smaller for alternative 2 than alternative 3.

Alternative 1 would not reduce the toxicity, mobility, or volume of the contaminants by other than natural processes.

8.5 Short-Term Effectiveness

None of the alternatives would be expected to pose an unacceptable risk to residents or workers during implementation. All potential impacts from construction and system operation would be readily controlled using standard engineering controls and practices.

Alternative 2 would be expected to cleanup the soils, including the smear zone, in the shortest amount of time, thus eliminating the source of groundwater contamination.

Alternative 3 would require much more time than alternative 2 to achieve soil cleanup because of the inability to excavate all the contaminated soils, especially those in the smear zone on top of the groundwater. Although alternative 3 would include more extensive groundwater extraction and treatment, whether or not the groundwater treatment would be able to achieve cleanup standards faster than natural processes is questionable because of the large amounts of remaining soil contamination that would continue to contaminate the groundwater.

8.6 Implementability

All alternatives would use readily available technologies and would be feasible to construct. Alternative 1 would be readily implementable because it would require no additional action other than monitoring and/or institutional controls.

The success of removing petroleum products on top of the groundwater as a part of Alternatives 2 and 3 depends on the amount of petroleum product that flows into the collection system. Effective collection of petroleum is difficult with the thin layers of petroleum products and the large fluctuation in groundwater levels found at Eielson AFB.

The technologies included in Alternative 2 for the removal of petroleum contamination are being implemented at three other fuel-contaminated areas at Eielson AFB. The results to date have been encouraging. These technologies appear to be the most effective method for treating the smear-zone soils on top of the groundwater where much of the residual petroleum contamination remains.

Alternative 3 would be poor in effectiveness and implementablity because it is not possible to excavate large volumes of contaminated soil near pipelines, tanks, and operating systems, nor in the smear-zone soil. Furthermore, although groundwater extraction and treatment is a commonly used technology, its effectiveness in achieving groundwater cleanup standards is not well established.

8.7 Cost

On the basis of the information available at the time the alternatives were developed, the estimated cost for each alternative is presented in Table 8.2. The cost estimates are order-of-magnitude estimates with an intended accuracy of +50% and -30%. The accuracy limits are based on EPA (1988) guidance.

Table 8.2. Cost of Alternatives

Source Area and Type of Cost[a]	Alternative 1 ($)	Alternative 2 ($)	Alternative 3 ($)
ST20, E-7 Complex			
Capital[b]	N/A	760,000	1,380,000
Total[c]	N/A	2,520,000	4,900,000
ST20, E-8 Complex			
Capital	N/A	245,000	1,130,000
Total	N/A	1,425,000	4,500,000
ST20, E-9 Complex			
Capital	N/A	745,000	5,900,000
Total	N/A	3,245,000	5,900,000
ST48			
Capital	N/A	904,000	1,580,000
Total	N/A	3,060,000	5,100,000
SS50, SS51, and SS52: Blair Lakes			
Capital	N/A	360,000	230,000
Total	N/A	1,945,000	1,100,000

N/A = not applicable.
[a]Cost estimates are rough; use only for comparison among alternatives.
[b]Capital costs include design, equipment, installation, and startup costs.
[c]Total costs include capital costs plus 30 years of operation at 5% inflation.

The cost estimates should only be used for comparison between alternatives, and not for comparisons with other facilities, especially if the other areas are in the lower 48 states where costs are lower. Cost estimates, both capital and operations and maintenance, are elevated because of 1) Alaska labor rates that are 30% higher, and 2) major equipment costs that are 25% higher. Materials costs were estimated to be comparable with those in the lower 48 states.

The system described in alternative 3 would be implemented in phases, based on actual conditions found in the field. The costs included in Table 8.2 are conservative because all

system components were assumed to be required. If some of the components are not required, the actual costs may be significantly lower.

8.8 State Acceptance

The State of Alaska concurs with the actions proposed in this record of decision. The following non-CERCLA actions, although outside this record of decision, have been projected to occur.

- The two 10,000-gallon USTs at ST49 will be removed in accordance with 18 AAC 78, "Underground Storage Tank Regulations."

- In a continuing effort to minimize the risks associated with exposure to contaminated groundwater and to control additional plume migration, dewatering efforts associated with ongoing base activities will be coordinated with the State of Alaska in accordance with 18 AAC 72, "Wastewater Disposal Regulations."

8.9 Community Acceptance

Community response to the actions proposed in this record of decision were generally positive. The one formal comment received and a response are discussed in the final part of this record of decision, the Responsiveness Summary.

9.0 Selected Remedy

9.1 No Further Action Sites

The cumulative risks for SS53 are within acceptable regulatory levels. Environmental cleanup is not proposed under Superfund.

No additional risks are posed by DP54 and, therefore, environmental cleanup is not proposed under Superfund.

The cumulative risks for ST49 are within acceptable regulatory levels. Environmental cleanup is not proposed under Superfund. However, under the Underground Storage Tank Program, the U.S. Air Force will remove the tanks at ST49.

9.2 Recommended Treatment Action

Source areas ST20 (E-7, E-8, and E-9 Complexes), ST48, SS50, SS51, and SS52 will require cleanup. Based upon CERCLA requirements, the detailed analysis of the alternatives using the nine criteria, and public comments, the U.S. Air Force, ADEC, and EPA have determined that alternative 2 is the most appropriate remedy for each source area. Major components of the selected remedy include the following.

- Continue to operate the skimming system at SS51.
- Install passive skimming systems to remove fuel floating atop the groundwater if the product is sufficiently mobile to be recoverable.
- Install a bioventing/ soil vapor extraction system (SVE) to remediate soil contamination that poses a threat to groundwater through leaching at ST20 (E-8 Complex), SS50, SS51, and SS52. This system may include air injection within the upper part of the groundwater table and the smear zone to volatilize and promote bioremediation of the contaminants. This entire system is also anticipated to reduce fuel floating atop the groundwater. The effect of a bioventing system on the permafrost at Blair Lakes will be evaluated prior to implementation
- Expand the bioventing/SVE systems currently operating under the interim remedial action (OU1B) at ST20 (E-7 and E-9 Complexes) and ST48 to remediate soil contamination that poses a threat to groundwater through leaching. This system expansion may include air injection within the upper part of the groundwater table and the smear zone to

volatilize and promote bioremediation of the contaminants. This entire system is also anticipated to reduce fuel floating atop the groundwater.

- Monitor groundwater at ST20 (E-7, E-8, and E-9 Complexes), ST48, SS50, SS51, and SS52, including increased monitoring (e.g., increased frequency, additional monitoring wells) near base water supply wells, to evaluate contaminant fate and transport until remediation levels are achieved.

- Notify the regulatory agencies of proposed dewatering activities, and evaluate their potential for impacting areas of groundwater contamination.

- Implement institutional controls to prevent exposure to contaminated groundwater. In the event of base closure, any remaining contaminated source areas will be addressed in accordance with CERCLA Section 120.

- Perform supplemental soil and groundwater sampling in the vicinity of well 50M05 (Blair Lakes) to confirm that no significant contamination remains.

Alternative 2 reduces risk substantially through treatment of the principal sources of groundwater contamination—fuels on top of the groundwater and soil contamination. Groundwater monitoring and institutional controls to restrict the use of groundwater will continue in the source areas. Institutional land use controls will be designed to prevent exposure to contaminated groundwater and will involve prohibiting the installation and use of any well for drinking water that could extract contaminated groundwater or affect the movement of contaminated groundwater. Site maps will be developed showing areas currently and potentially impacted by groundwater contaminants. This information can be referenced during base permitting procedures. To ensure long-term integrity of the above land use controls, the Air Force will ensure that, to the extent that groundwater contamination remains above unacceptable levels, deed restrictions or equivalent safeguards will be implemented in the event that property containing such contamination is transferred by the Air Force.

The goal of this remedial action is to restore groundwater to its beneficial use within a timeframe that is reasonable given the particular circumstances of the source area. Based on information obtained during the remedial investigation and on a careful analysis of all remedial alternatives, the U.S. Air Force, State of Alaska, and EPA believe that the selected remedies will achieve this goal.

10.0 Statutory Determinations

The selected remedy meets the statutory requirements of Section 121 of CERCLA, as amended by SARA, and to the extent practicable, the National Contingency Plan. The evaluation criteria are discussed in this section.

10.1 Protection of Human Health and the Environment

The selected remedies protect human health and the environment through the removal of the principal sources of groundwater contamination. VOC-contaminated groundwater will be remediated by removing the source of continuing groundwater contamination. During the cleanup, institutional controls will eliminate the threat of exposure to contaminated groundwater.

The two principal sources of groundwater contamination are floating fuel and VOC-contaminated soils. The floating fuel will be removed by passive skimming where feasible (ST20, ST48, SS50, SS51, and SS52); soil contamination will be removed by vapor extraction and/or bioventing/SVE (ST20, ST48, SS50, SS51, and SS52). The baseline risk assessment (U.S. Air Force 1994b) estimated a reasonable maximum exposure risk for residential land-use from ST20 E-7 Complex at 1.1×10^{-2} for carcinogenic risk with a HI of 1,800 for noncarcinogenic risks. At ST20 E-8 Complex, the estimates are 8.5×10^{-4} for carcinogenic risk with a HI of 4.3 for noncarcinogenic risks. For ST20 E-9 Complex, the estimates are 2.1×10^{-2} for carcinogenic risk with a HI of 24 for noncarcinogenic risks. The estimate for ST48 is 4.9×10^{-3} for carcinogenic risk and a HI of 14 for noncarcinogenic risk. The estimate at Blair Lakes (SS50, SS51, and SS52) is 4.4×10^{-4} for carcinogenic risk with a HI of 17 for noncarcinogenic risks. Once the final remediation goals are achieved, the cancer risks, for all source areas, will be reduced to 9×10^{-6} and the HI will be reduced to 2.

No unacceptable short-term risks or cross-media impacts will be caused by implementation of the remedy.

10.2 Attainment of Applicable or Relevant and Appropriate Requirements of Environmental Laws

The selected remedies will comply with all ARARs of federal and State of Alaska environmental and public health laws.

10.2.1 Applicable or Relevant and Appropriate Requirements

The remedy chosen for each set of source areas will comply with all action-, chemical-, and location-specific ARARs. The ARARs are listed in the following sections, and the relationship between them and the three remedial alternatives are listed in Table 7.3.

10.2.1.1 Action-Specific

Remedial treatment activities will meet the following action-specific ARARs:

- State of Alaska Solid Waste Management Regulations (18 AAC 60) for disposal of treated soils
- State of Alaska Wastewater Disposal Regulations (18 AAC 72) for the discharge of industrial wastewater
- State of Alaska Hazardous Waste Regulations (18 AAC 62) for the treatment and disposal of hazardous wastes
- RCRA Waste Standard Land Disposal Restrictions (40 CFR 268) may be applicable if placement of RCRA hazardous wastes occur
- RCRA Waste Standards (40 CFR 264.251) that specify which waste piles must use a single liner and leachate collection system
- Federal Clean Air Act (42 USC 7401), as amended, for venting contaminated vapors
- Federal Ambient Water Quality Criteria (AWQC §304) and State of Alaska Water Quality Standards (18 AAC 70) for discharges into Garrison Slough (column 4 of Table 32).

10.2.1.2 Chemical-Specific

Remedial treatment activities will meet the following chemical-specific ARARs:

- MCLs and maximum contaminant level goals (MCLs, non-zero maximum contaminant level goals, and action levels) established under the *Safe Drinking Water Act* for groundwater, which may be used for drinking water supply (40 CFR 141 and 18 AAC 80). These ARARs are listed in column 2 of Table 10.1.
- Alaska Water Quality Standards for Protection of Class (1)(A) Water Supply, Class (1)(B) Water Recreation, and Class (1)(C) Aquatic Life and Wildlife (18 AAC 70).
- Alaska Oil Pollution Regulations (18 AAC 75)

  Under the Alaska Oil Pollution Regulations, responsible parties are required to clean up oil or hazardous releases. The U.S. Air Force anticipates achieving a cleanup level that is consistent with this regulation. The U.S. Air Force has proposed a calculation of soil cleanup levels based on the findings in the baseline risk assessment (U.S. Air Force 1994b) and a methodology using the EPA SESOIL and AT123D models (Anderson 1992). The proposed soil cleanup levels are based on protecting groundwater in accordance with drinking water standards.

Table 10.1. Chemical-Specific Applicable or Relevant and Appropriate Requirements for Chemicals of Concern

Constituent	Groundwater	Surface Water		Soil[a]
	Drinking Water MCL (mg/L)	AWQC Aquatic Life Freshwater Chronic (mg/L)	AWQC Human Health Fish Consumption (mg/L)	Alternative Cleanup Levels for Petroleum Contaminants (mg/kg)
Benzene	5	5,300[b]	40	0.2
Toluene	1,000	17,500[b]	424,000	80
Ethylbenzene	700	32,000[b]	3,280	140
Xylenes	10,000			760

[a]Soil cleanup levels were established to protect groundwater from leachate. The model used to calculate these values is from Anderson (1992).
[b]Freshwater acute criterion, no freshwater chronic criterion exists for these compounds.

- Alaska Regulations for Leaking Underground Storage Tanks (18 AAC 78)

  Under the Alaska regulations for remediation of contaminated soils and cleanup of petroleum releases from USTs, the ADEC regional supervisor has the authority to determine the level of cleanup that is appropriate for site-specific conditions. The regional supervisor may identify alternative cleanup standards based on the potential for leaching to groundwater. In accordance with this requirement, alternative soil cleanup standards have been calculated (column 5 of Table 28) based on the findings in the baseline risk assessment (U.S. Air Force 1994b) and a methodology using the EPA SESOIL and AT123D models (Anderson 1992). The soil cleanup levels are based on protecting groundwater in accordance with drinking water standards (U.S. Air Force 1994b).

10.2.1.3 Location-Specific Applicable or Relevant and Appropriate Requirements

None.

10.2.2 Information To-Be-Considered

The following information to-be-considered will be used as a guideline when implementing the selected remedy:

- State of Alaska Interim Guidance for Non-UST Contaminated Soil Cleanup Levels (July 17, 1991)
- State of Alaska Guidance for Storage, Remediation, and Disposal of Non-UST Petroleum Contaminated Soils (July 29, 1991)
- State of Alaska Interim Guidance for Surface and Groundwater Cleanup Levels (September 26, 1990).

10.3 Cost Effectiveness

Alternative 2, the selected remedy, is cost effective because it has been determined to provide overall effectiveness proportionate to its costs and duration for remediation of the contaminated soils and groundwater. The 30-year present worth for alternative 2 is lower than the 30-year present worth for alternative 3 at all source areas except Blair Lakes. The higher cost of alternative 2 at Blair Lakes is because of the limited area of excavation that can be done under alternative 3 because of buildings and utilities.

10.4 Use of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

The U.S. Air Force, the State of Alaska, and EPA have determined that the selected remedies represent the maximum extent to which permanent solutions and treatment technologies can be used in a cost-effective manner at the OU1 source areas. Of those alternatives that protect human health and the environment and comply with ARARs, the U.S. Air Force, the State of Alaska, and EPA have determined that the selected remedies provide the best balance of tradeoffs in terms of long-term effectiveness and permanence, reduction in toxicity, mobility, or volume through treatment, short-term effectiveness, implementability, cost (as discussed in Section 10.3), and the statutory preference for treatment as a principal element and considering state and community acceptance.

Alternative 2 is designed to be implemented in stages, each stage more aggressive in cleanup than the previous. Alternative 2 will treat the source of VOC groundwater contamination, VOC-contaminated subsurface soils, and floating fuel. The VOC-contaminated groundwater will be allowed to remediate by source reduction. Alternative 3 would remediate the soil contamination by removal and treatment; however, it will not treat as large a volume of soil. Large volumes of contaminated soils could not be excavated because of existing buildings and utilidors. The remaining soil contamination would be allowed to slowly move through the soil to the groundwater, where it would be pumped out and treated. Alternative 3 would remove floating fuel only through active skimming, an option that is unlikely to remove more than half of this material. Furthermore, although groundwater extraction and treatment is a commonly used technology, its effectiveness in achieving groundwater cleanup standards is not well established.

Alternatives 2 and 3 would result in the greatest reduction in toxicity, mobility, and volume of contamination by treating or removing VOC-contaminated soils and floating fuel. Alternative 2 is expected to be more effective. However, alternative 2 does not actively treat VOC-contaminated groundwater. Alternative 3 does actively reduce VOC-contamination through extraction and treatment.

Alternative 2 would be expected to cleanup the soils in the shortest amount of time, thus eliminating the source of groundwater contamination. Alternative 3 would require much more time than alternative 2 to achieve soil cleanup because of the inability to excavate all of the contaminated soils.

All alternatives would use readily available technologies and would be feasible to construct. Alternative 1 would be readily implementable; it requires no additional remedial action. The technologies in alternative 2 are relatively limited in scope and would also be readily implementable. Several of the technologies in alternative 2 for the removal of petroleum contamination (bioventing, soil vapor extraction, and skimming) have already been implemented at three other fuel-contaminated areas in OU1. The results to date suggest that bioventing (Battelle 1994) and soil vapor extraction (EA 1994) are effective. Skimming for fuel has only been successful at one of four demonstrations (EA 1994). Alternative 3 would be difficult to implement effectively because it is not possible to excavate large volumes of contaminated soils near pipelines, tanks, or operating systems.

The most decisive factors in the selection decision were long-term effectiveness and implementability. Alternative 2 provides the best option for effective remediation of ST20, ST48, and SS50 through SS52.

10.5 Preference for Treatment as a Principal Element

By treating the source of VOC-contaminated groundwater, the selected remedies address the principal threats posed by the source areas through the use of treatment technologies. Therefore, the statutory preference for remedies that employ treatment as a principal element is satisfied.

11.0 References

18 AAC 60. "Solid Waste Management Regulations." Alaska Administrative Code.

18 AAC 62. "Hazardous Waste Regulations." Alaska Administrative Code.

18 AAC 70. "Alaska Water Quality Standards." Alaska Administrative Code.

18 AAC 72. "Wastewater Disposal Regulations." Alaska Administrative Code.

18 AAC 78. "Underground Storage Tank Regulations." Alaska Administrative Code.

18 AAC 80. "Environmental Conservation: Drinking Water." Alaska Administrative Code.

40 CFR 141. "National Primary Drinking Water Regulations." Code of Federal Regulations.

40 CFR 264.251. "Waste Standards." Code of Federal Regulations.

40 CFR 268. "Land Disposal Restrictions." Code of Federal Regulations.

54 FR 48184. "National Priorities List for Uncontrolled Hazardous Waste Sites." *Federal Register*. November 21, 1989.

Anderson. 1992. *Development of Generic Soil Cleanup Levels Based on Analysis of the Leachate Pathway*. Environmental Cleanup Division, Department of Environmental Quality, May 12.

Battelle. 1992. *Remedial Investigation/Feasibility Study -- Operable Units 3, 4, and 5 Management Plan, Eielson Air Force Base, Alaska*. Battelle, Environmental Management Operations, Richland, Washington (Final).

Battelle. 1994. *Bioremediation of Hazardous Wastes at CERCLA and RCRA Sites: Eielson AFB Site*. Project Report, Battelle, Columbus Division, Columbus, Ohio.

Cederstrom, D. J. 1963. *Ground-Water Resources of the Fairbanks Area, Alaska*. U.S. Geological Survey Water-Supply Paper 1590.

CH2M Hill. 1982. *Installation Restoration Program Records Search for Eielson Air Force Base, Alaska*. CH2M Hill, Gainesville, Florida.

Dames and Moore. 1985. *Installation Restoration Program Phase II - Confirmation/Quantification Stage 1 First Draft Report for Eielson Air Force Base, Alaska, Alaskan Air Command*. Prepared by Dames & Moore for the U.S. Air Force Occupational and Environmental Health Laboratory, Brooks Air Force Base, Texas.

EA. 1994. "OU1B Interim Remedial Action, Outline Summary of Work at Source Areas ST-20, (E-7), ST-20 (E-9), ST-48, ST-49, and SS50-52 during 1991 and 1993." Letter Report. EA Engineering, Science, and Technology.

Harding Lawson Associates (HLA). 1989. *Installation Restoration Program Remedial Investigation/Feasibility Study, Stage 3, Eielson Air Force Base, Draft Remedial Investigation/Feasibility Study, Volume II (July 1988 to April 1989).* Harding Lawson Associates, Anchorage, Alaska.

Harding Lawson Associates (HLA). 1990. *Installation Restoration Program Remedial Investigation/Feasibility Study, Stage 4, Draft Remedial Investigation/Feasibility Study, Volumes I through V.* Harding Lawson Associates, Anchorage, Alaska.

Harding Lawson Associates (HLA). 1991. *Installation Restoration Program Remedial Investigation/Feasibility Study, Stage 4, Draft Remedial Investigation/Feasibility Study, Volumes VII through XVIII.* Prepared by Harding Lawson Associates, Anchorage, Alaska.

Krumhart, A. P. 1982. *Hydrologic Information for Land-Use Planning, Badger Road Area, Fairbanks, Alaska.* Water-Resources Investigation 82-4097. U.S. Geological Survey.

Nelson, G. 1978. *Hydrologic Information for Land-Use Planning, Fairbanks Vicinity, Alaska.* U.S. Geological Survey.

Pacific Northwest Laboratory (PNL). 1994. *Declaration of the Record of Decision, Eielson Air Force Base, Operable Unit 2 and Other Areas.* PNL-10056, Pacific Northwest Laboratory, Richland, Washington.

U.S. Air Force. 1992. *Interim Remedial Action Record of Decision, Eielson Air Force Base, Operable Unit 1B.* Prepared by EA Engineering, Science, and Technology, Lafayette, California.

U.S. Air Force. 1993a. *Background Groundwater Quality, Eielson Air Force Base, Alaska.* Prepared by Pacific Northwest Laboratory, Richland, Washington (Final).

U.S. Air Force. 1993b. *Background Soil Quality, Eielson Air Force Base, Alaska.* Prepared by Pacific Northwest Laboratory, Richland, Washington (Final).

U.S. Air Force. 1993c. *Eielson Air Force Base OU-2 Remedial Investigation/Feasibility Study: Baseline Risk Assessment.* Prepared by Pacific Northwest Laboratory, Richland, Washington (Final).

U.S. Air Force. 1993d. *Eielson Air Force Base OU-2 Remedial Investigation/Feasibility Study: Remedial Investigation Report.* Prepared by Pacific Northwest Laboratory, Richland, Washington (Final).

U.S. Air Force. 1994a. *Eielson Air Force Base OU-1 Remedial Investigation/Feasibility Study: Remedial Investigation Report.* Prepared by Pacific Northwest Laboratory, Richland, Washington (Final).

U.S. Air Force. 1994b. *Eielson Air Force Base OU-1 Remedial Investigation/Feasibility Study: Baseline Risk Assessment.* Prepared by Pacific Northwest Laboratory, Richland, Washington (Final).

U.S. Air Force. 1994c. *Eielson Air Force Base OU-1 Remedial Investigation/Feasibility Study: Feasibility Study.* Prepared by Pacific Northwest Laboratory, Richland, Washington (Final).

U.S. Air Force. 1994d. *Proposed Plan for Operable Unit 1.* Prepared by Pacific Northwest Laboratory, Richland, Washington (Final).

U.S. Environmental Protection Agency (EPA). 1988. *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA.* OSWER Directive 9355.3-01, U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, D.C. (Interim Final).

U.S. Environmental Protection Agency (EPA). 1991. *Supplemental Guidance for Superfund Risk Assessments in Region 10.* U.S. Environmental Protection Agency, Seattle, Washington.

U.S. Environmental Protection Agency, Alaska Department of Environmental Conservation (ADEC) and U.S. Air Force. 1991. *Eielson AFB Federal Facility Agreement under CERCLA Section 120,* EPA Docket Number: 1089-07-14-120.

Weddleton, J., H. Richards, and R. Seifert. 1989. *Building in Alaska. A Guide for Assessing Risks and Costs of Water Well Drilling in the Fairbanks Area.* Cooperative Extension Service, University of Alaska Fairbanks, Fairbanks, Alaska.

Eielson Air Force Base
Operable Unit 1 and Other Areas
Record of Decision

Responsiveness Summary

A. Overview

The joint cleanup decision preferred by the U.S. Air Force, Alaska Department of Environmental Conservation (ADEC), and U.S. Environmental Protection Agency (EPA) was presented to the public in a Proposed Plan (U.S. Air Force 1994d) and discussed in a public meeting on June 22, 1994. This plan proposed that three of the Operable Unit 1 (OU1) source areas (ST49, SS53, and DP54) would require no further remedial action. All were found to not pose an unacceptable risk to human health and the environment. Remedial action was proposed for the remaining OU1 source areas (ST20 [E-7, E-8, and E-9], ST48, SS50, SS51, and SS52). The preferred cleanup method, alternative 2 of the OU1 feasibility study (FS) (U.S. Air Force 1994a), would use a combination of bioventing and soil vapor extraction. Also where floating fuel can be recovered, an extraction system will be operated. The guiding principle for this alternative was to perform in situ treatment of the fuel-contaminated soil and a floating fuel layer to halt continued groundwater contamination.

One public comment was received in response to the Proposed Plan and public meeting. A response to the comment is presented under Section C, "Summary of Comments Received During the Public Comment Period and Responses." The comment was positive and general in nature expressing local community concerns. No technical or legal issues were raised.

B. Background on Community Involvement

After signing the *Federal Facility Agreement Under CERCLA Section 120* (EPA et al. 1991) with the State of Alaska and the EPA, the U.S. Air Force began its Superfund cleanup program. As part of this program, in accordance with CERCLA Sections 113(k)(2)(B)(i-v) and 117, an extensive community relations program was initiated to involve the community in the decision-making process.

As part of the U.S. Air Force installation Restoration Program, a Technical Review Committee (TRC) was established in 1992 including three representatives from the community (selected by local officials and the Chancellor of the UNiversity of Alaska, Fairbanks), industry representatives, environmental agency representatives, and in January 1994, a local environmental interest group was invited to participate. Many of the TRC participants are

members of the professional public. The Proposed Plan was presented to a TRC on January 27, 1994. At this meeting, representatives from the U.S. Air Force, ADEC, and EPA responded to questions from the audience representing the University of Alaska, the City of North Pole, and various state and federal agencies.

The primary means for public involvement was through a public notice period and a public meeting. The Proposed Plan for OU1 was advertized in the Fairbanks Daily News Miner, June 4, 1994. A story on the same plan appeared in the North Pole Independent, June 3, 1994. The public meeting for OU1 was advertized in the Fairbanks Daily News Miner, June 21, 1994. A news release was sent to all local news media announcing the Proposed Plan and public meeting.

C. Summary of Comments Received During the Public Comment Period and Responses

The public comment period on the OU1 Proposed Plan was held from June 1 until July 1, 1994. Comments received during that period are summarized below. Part I addresses nontechnical concerns, while Part II responds to technical and legal questions.

PART I Summary and Response to Local Community Concerns

Topic: Support for the selected alternative and concern for the cost.

Public Comment # 1: This person expressed support for the alternative selected based on the information presented in the Proposed Plan but expressed a concern for the cost of this and future cleanup efforts. The person stated that "it is reassuring to know what steps are being taken to insure the future well being of the state and health of its residents."

Response: We appreciate your support for the alternative selected and recognition of the Air Force efforts to clean up past environmental mistakes. Your concern for cleanup costs are well founded and will be given every consideration for this and future cleanup efforts.

Appendix A - Analytical Data for all Source Areas

APPENDIX VIII - ANALYTICAL DATA

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 1

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
48	Soil	Stage 3	2-Methylnaphthalene	30	ug/kg	14	2	3000	42000	48TP04
			Benzene	44	ug/kg	14	1	112	112	48TP04
			Bis(2-ethylhexyl) phthalate	100	ug/kg	14	1	1200	1200	48M04
			Chlorobenzene	20	ug/kg	14	1	80	80	48TP04
			Di-n-octylphthalate	150	ug/kg	14	1	700	700	53M03
			Ethylbenzene	80	ug/kg	14	1	3700	3700	48TP04
			Fluorene	30	ug/kg	14	1	210	210	53M03
			Lead	4560	ug/kg	13	9	5420	23500	48M02
			Moisture	.	Percent	14	14	1.9	37.1	48TP02
			Naphthalene	9	ug/kg	14	2	1400	21000	48TP04
			Phenanthrene	20	ug/kg	14	1	110	110	53M03
			TPH	10000	ug/kg	14	8	38600	13000000	48TP04
			Toluene	160	ug/kg	14	1	410	410	48TP04
			Xylenes (total)	80	ug/kg	14	2	0.42	18.2	48TP04

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 2

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
48	Soil	Stage 4	Moisture	.	Percent	24	24	1.7	27.9	48SB09
			TPH	10000	ug/kg	100	40	13000	32000000	48SB02

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
48	Soil	1993	0,0,0-Triethyl phosphorothioate	660	ug/kg	6	.	.	.	
			0,0-Diethyl 0-2-pyrazinyl phosphorothio	660	ug/kg	6	.	.	.	
			1,2,4,5-Tetrachlorobenzene	660	ug/kg	6	.	.	.	
			1,2,4-Trichlorobenzene	660	ug/kg	6	.	.	.	
			1,2-Dichlorobenzene	660	ug/kg	6	.	.	.	
			1,3-Dichlorobenzene	660	ug/kg	6	.	.	.	
			1,4-Dichlorobenzene	660	ug/kg	6	.	.	.	
			1,4-Naphthoquinone	660	ug/kg	6	.	.	.	
			1-Naphthylamine	660	ug/kg	6	.	.	.	
			2,3,4,6-Tetrachlorophenol	660	ug/kg	6	.	.	.	
			2,4,5-Trichlorophenol	660	ug/kg	6	.	.	.	
			2,4,6-Trichlorophenol	660	ug/kg	6	.	.	.	
			2,4-Dichlorophenol	660	ug/kg	6	.	.	.	
			2,4-Dimethylphenol	660	ug/kg	6	.	.	.	
			2,4-Dinitrophenol	3300	ug/kg	6	.	.	.	
			2,4-Dinitrotoluene	660	ug/kg	6	.	.	.	
			2,6-Dichlorophenol	660	ug/kg	6	.	.	.	
			2,6-Dinitrotoluene	660	ug/kg	6	.	.	.	
			2-Acetylaminofluorene	660	ug/kg	6	.	.	.	
			2-Chloronaphthalene	660	ug/kg	6	.	.	.	
			2-Chlorophenol	660	ug/kg	6	.	.	.	
			2-Methylnaphthalene	660	ug/kg	6	1	46000	46000	53M03
			2-Methylphenol	660	ug/kg	6	.	.	.	
			2-Naphthylamine	660	ug/kg	6	.	.	.	
			2-Nitroaniline	3300	ug/kg	6	.	.	.	
			2-Nitrophenol	660	ug/kg	6	.	.	.	
			2-Picoline	660	ug/kg	6	.	.	.	
			3,3'-Dichlorobenzidine	1300	ug/kg	6	.	.	.	
			3,3'-Dimethylbenzidine	660	ug/kg	6	.	.	.	
			3-Methylcholanthrene	660	ug/kg	6	.	.	.	
			3-Nitroaniline	3300	ug/kg	6	.	.	.	
			4,4'-DDD	20	ug/kg	3	2	4.4	63	COMPOSITE
			4,4'-DDE	10	ug/kg	3	1	47	47	COMPOSITE
			4,4'-DDT	20	ug/kg	3	1	180	180	COMPOSITE
			4,6-Dinitro-o-cresol	3300	ug/kg	6	.	.	.	
			4-Aminobiphenyl	660	ug/kg	6	.	.	.	
			4-Bromophenylphenyl ether	660	ug/kg	6	.	.	.	
			4-Chloro-3-methylphenol	1300	ug/kg	6	.	.	.	
			4-Chloroaniline	1300	ug/kg	6	.	.	.	
			4-Chlorophenylphenyl ether	660	ug/kg	6	.	.	.	
			4-Methylphenol	660	ug/kg	6	.	.	.	
			4-Nitroaniline	3300	ug/kg	6	.	.	.	
			4-Nitrophenol	3300	ug/kg	6	.	.	.	
			4-Nitroquinoline-1-oxide	660	ug/kg	6	.	.	.	
			5-Nitro-o-toluidine	660	ug/kg	6	.	.	.	
			7,12-Dimethylbenz[a]anthracene	660	ug/kg	6	.	.	.	
			Acenaphthene	660	ug/kg	6	.	.	.	
			Acenaphthylene	660	ug/kg	6	.	.	.	
			Acetophenone	660	ug/kg	6	.	.	.	
			Aldrin	10	ug/kg	3	.	.	.	
			Alpha-BHC	10	ug/kg	3	.	.	.	
			Aluminum	20000	ug/kg	2	2	11000000	11000000	NEW WELL
			Aniline	660	ug/kg	6	.	.	.	
			Anthracene	660	ug/kg	6	1	400	400	NEW WELL
			Antimony	20000	ug/kg	2	.	.	.	
			Aramite	660	ug/kg	6	.	.	.	
			Aroclor-1016	100	ug/kg	6	.	.	.	
			Aroclor-1221	200	ug/kg	6	.	.	.	

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
48	Soil	1993	Aroclor-1232	200	ug/kg	6	.	.	.	
			Aroclor-1242	100	ug/kg	6	.	.	.	
			Aroclor-1248	100	ug/kg	6	.	.	.	
			Aroclor-1254	100	ug/kg	6	.	.	.	
			Aroclor-1260	100	ug/kg	6	.	.	.	
			Arsenic	500	ug/kg	2	2	4800	7400	NEW WELL
			Barium	2000	ug/kg	2	2	130000	350000	NEW WELL
			Benzo(a)anthracene	660	ug/kg	6	1	970	970	NEW WELL
			Benzo(a)pyrene	660	ug/kg	6	1	980	980	NEW WELL
			Benzo(b)fluoranthene	660	ug/kg	6	1	950	950	NEW WELL
			Benzo(ghi)perylene	660	ug/kg	6	1	540	540	NEW WELL
			Benzo(k)fluoranthene	660	ug/kg	6	1	870	870	NEW WELL
			Benzothiazole	660	ug/kg	6	.	.	.	
			Benzyl alcohol	1300	ug/kg	6	.	.	.	
			Beryllium	300	ug/kg	2	2	400	400	NEW WELL
			Beta-BHC	10	ug/kg	3	.	.	.	
			Bis(2-Chloroethoxy)methane	660	ug/kg	6	.	.	.	
			Bis(2-Chloroisopropyl) ether	660	ug/kg	6	.	.	.	
			Bis(2-chloroethyl) ether	660	ug/kg	6	.	.	.	
			Bis(2-ethylhexyl) phthalate	660	ug/kg	6	2	150	660	NEW WELL
			Butylbenzylphthalate	660	ug/kg	6	.	.	.	
			Cadmium	1000	ug/kg	2	1	430	430	NEW WELL
			Calcium	10000	ug/kg	2	2	6000000	11000000	NEW WELL
			Chlordane	50	ug/kg	3	1	15	15	COMPOSITE
			Chlorobenzilate	660	ug/kg	6	.	.	.	
			Chromium	2000	ug/kg	2	2	19000	24000	NEW WELL
			Chrysene	660	ug/kg	6	1	1100	1100	NEW WELL
			Cobalt	2000	ug/kg	2	2	7000	9000	NEW WELL
			Copper	2000	ug/kg	2	2	18000	24000	NEW WELL
			Delta-BHC	20	ug/kg	3	.	.	.	
			Di-n-butylphthalate	660	ug/kg	6	.	.	.	
			Di-n-octylphthalate	660	ug/kg	6	.	.	.	
			Diallate	660	ug/kg	6	.	.	.	
			Dibenz[a,h]anthracene	660	ug/kg	6	.	.	.	
			Dibenzofuran	660	ug/kg	6	.	.	.	
			Dieldrin	10	ug/kg	3	.	.	.	
			Diethylphthalate	660	ug/kg	6	.	.	.	
			Dimethoate	660	ug/kg	6	.	.	.	
			Dimethyl phthalate	660	ug/kg	6	.	.	.	
			Diphenylamine	660	ug/kg	6	.	.	.	
			Endosulfan I	10	ug/kg	3	.	.	.	
			Endosulfan II	10	ug/kg	3	.	.	.	
			Endosulfan sulfate	20	ug/kg	3	.	.	.	
			Endrin	10	ug/kg	3	.	.	.	
			Endrin Aldehyde	50	ug/kg	3	.	.	.	
			Ethyl methanesulfonate	660	ug/kg	6	.	.	.	
			Famphur	660	ug/kg	6	.	.	.	
			Fluoranthene	660	ug/kg	6	1	2200	2200	NEW WELL
			Fluorene	660	ug/kg	6	.	.	.	
			Gamma-BHC (Lindane)	10	ug/kg	3	.	.	.	
			Heptachlor	10	ug/kg	3	1	1	1	COMPOSITE
			Heptachlor epoxide	60	ug/kg	3	.	.	.	
			Hexachlorobenzene	660	ug/kg	6	.	.	.	
			Hexachlorobutadiene	660	ug/kg	6	.	.	.	
			Hexachlorocyclopentadiene	660	ug/kg	6	.	.	.	

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 5

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
48	Soil	1993	Hexachloroethane	660	ug/kg	6	.	.	.	
			Hexachlorophene	660	ug/kg	6	.	.	.	
			Hexachloropropene	660	ug/kg	6	.	.	.	
			Indeno(1,2,3-cd)pyrene	660	ug/kg	6	1	510	510	NEW WELL
			Iron	2000	ug/kg	2	2	12000000	19000000	NEW WELL
			Isodrin	660	ug/kg	6	.	.	.	
			Isophorone	660	ug/kg	6	.	.	.	
			Isosafrole	660	ug/kg	6	.	.	.	
			Kepone	660	ug/kg	6	.	.	.	
			Kerosene	660	ug/kg	6	1	370000	370000	53M03
			Lead	500	ug/kg	2	2	7000	21000	NEW WELL
			Magnesium	10000	ug/kg	2	2	3800000	4900000	NEW WELL
			Manganese	1000	ug/kg	2	2	260000	380000	NEW WELL
			Mercury	400	ug/kg	2	1	100	100	NEW WELL
			Methapyrilene	660	ug/kg	6	.	.	.	
			Methoxychlor	100	ug/kg	3	.	.	.	
			Methyl methanesulfonate	660	ug/kg	6	.	.	.	
			N-Nitroso-di-n-dipropylamine	660	ug/kg	6	.	.	.	
			N-Nitrosodi-n-butylamine	660	ug/kg	6	.	.	.	
			N-Nitrosodiethylamine	660	ug/kg	6	.	.	.	
			N-Nitrosodimethylamine	660	ug/kg	6	.	.	.	
			N-Nitrosodiphenylamine	660	ug/kg	6	.	.	.	
			N-Nitrosomethylethylamine	660	ug/kg	6	.	.	.	
			N-Nitrosomorpholine	660	ug/kg	6	.	.	.	
			N-Nitrosopiperidine	660	ug/kg	6	.	.	.	
			Naphthalene	660	ug/kg	6	1	16000	16000	53M03
			Nickel	3000	ug/kg	2	2	17000	22000	NEW WELL
			Nitrobenzene	660	ug/kg	6	.	.	.	
			Nitrosopyrrolidine	660	ug/kg	6	.	.	.	
			Parathion	660	ug/kg	6	.	.	.	
			Pentachlorobenzene	660	ug/kg	6	.	.	.	
			Pentachloronitrobenzene (PCNB)	660	ug/kg	6	.	.	.	
			Pentachlorophenol	3300	ug/kg	6	.	.	.	
			Phenacetin	660	ug/kg	6	.	.	.	
			Phenanthrene	660	ug/kg	6	1	1500	1500	NEW WELL
			Phenol	660	ug/kg	6	.	.	.	
			Potassium	30000	ug/kg	2	2	900000	1100000	NEW WELL
			Pronamide	660	ug/kg	6	.	.	.	
			Pyrene	660	ug/kg	6	1	2000	2000	NEW WELL
			Pyridine	660	ug/kg	6	.	.	.	
			Safrol	660	ug/kg	6	.	.	.	
			Silver	2000	ug/kg	2	.	.	.	
			Sodium	30000	ug/kg	2	2	340000	690000	NEW WELL
			TPH-diesel	4300	ug/kg	1	1	4900	11000	COALPILE
			TPH-diesel	4300	ug/kg	2	1	4900	11000	COALPILE
			TPH-gasoline	5100	ug/kg	1	.	.	.	
			TPH-gasoline	5400	ug/kg	2	.	.	.	
			Tetraethyl dithiopyrophosphate	660	ug/kg	6	.	.	.	
			Tin	10000	ug/kg	2	.	.	.	
			Toxaphene	400	ug/kg	3	.	.	.	
			Tributyl phosphate	660	ug/kg	6	.	.	.	
			Tris-2-chloroethyl phosphate	660	ug/kg	6	.	.	.	
			Vanadium	3000	ug/kg	2	2	33000	44000	NEW WELL
			Zinc	10	ug/kg	2	2	34000	130000	NEW WELL
			alpha,alpha-Dimethylphenethylamine	660	ug/kg	6	.	.	.	

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 6

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
48	Soil	1993	m-Cresol	660	ug/kg	6	.	.	.	
			m-Dinitrobenzene	660	ug/kg	6	.	.	.	
			o-Toluidine	660	ug/kg	6	.	.	.	
			p-Dimethylaminoazobenzene	660	ug/kg	6	.	.	.	
			p-Phenylenediamine	660	ug/kg	6	.	.	.	
			sym-Trinitrobenzene	660	ug/kg	6	.	.	.	

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 7

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
48	Soil Gas	Stage 3	1,3-Dimethylbenzene	10	ug/L	45	12	10	2610	48SV32
			BTEX	10	ug/L	45	24	10	43400	48SV20
			Benzene	10	ug/L	45	14	10	390	48SV01
			Ethylbenzene	10	ug/L	45	15	10	11800	48SV32
			Toluene	10	ug/L	45	17	10	39600	48SV20

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 8

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
48	Water	Stage 3	2,4-Dimethylphenol	0.28	ug/L	9	1	5.1	5.1	48M01
			2-Methylnaphthalene	0.9	ug/L	9	2	130	261	53M03
			Aluminum (Unfiltered)	30	ug/L	1	1	11900	11900	53M03
			Arsenic (Filtered)	40	ug/L	1	1	20	20	53M03
			Arsenic (Unfiltered)	40	ug/L	1	1	26.8	26.8	53M03
			Barium (Filtered)	1	ug/L	1	1	50	50	53M03
			Barium (Unfiltered)	1	ug/L	1	1	722	722	53M03
			Benzene	0.15	ug/L	9	5	0.34	1330	48M01
			Bis(2-ethylhexyl) phthalate	2	ug/L	9	1	700	700	48P01
			Butylbenzylphthalate	1.5	ug/L	9	1	520	520	48P01
			Calcium (Filtered)	13	ug/L	1	1	174000	174000	53M03
			Calcium (Unfiltered)	13	ug/L	1	1	136000	136000	53M03
			Chloride	200	ug/L	1	1	11250	11250	53M03
			Chloroform	0.2	ug/L	9	.	.	.	
			Chromium (Unfiltered)	10	ug/L	1	1	12.3	12.3	53M03
			Cobalt (Unfiltered)	10	ug/L	1	1	18	18	53M03
			Copper (Unfiltered)	3	ug/L	1	1	118	118	53M03
			Ethylbenzene	0.46	ug/L	9	2	89.2	160	48M01
			Iron (Filtered)	20	ug/L	1	1	24700	24700	53M03
			Iron (Unfiltered)	20	ug/L	1	1	42400	42400	53M03
			Lead (Filtered)	1.4	ug/L	9	1	3	3	48M03
			Lead (Unfiltered)	1.4	ug/L	9	7	2.7	152	48M05
			Magnesium (Filtered)	44	ug/L	1	1	36900	36900	53M03
			Magnesium (Unfiltered)	44	ug/L	1	1	43700	43700	53M03
			Manganese (Filtered)	1.4	ug/L	1	1	5200	5200	53M03
			Manganese (Unfiltered)	1.4	ug/L	1	1	5670	5670	53M03
			Mercury (Filtered)	0.2	ug/L	1	1	0.7	0.7	53M03
			Mercury (Unfiltered)	0.2	ug/L	1	1	0.3	0.3	53M03
			Naphthalene	0.26	ug/L	9	2	230	440	53M03
			Nitrite/Nitrate	10	ug/L	8	4	15	185	48M04
			Potassium (Filtered)	408	ug/L	1	1	4980	4980	53M03
			Potassium (Unfiltered)	408	ug/L	1	1	7200	7200	53M03
			Residue, DISS	1000	ug/L	9	9	200000	704000	53M03
			Sodium (Filtered)	82	ug/L	1	1	11000	11000	53M03
			Sodium (Unfiltered)	82	ug/L	1	1	13200	13200	53M03
			Sulfate	500	ug/L	1	1	130700	130700	53M03
			TPH	100	ug/L	9	2	3400	44000	48M01
			Toluene	0.25	ug/L	9	2	53.2	88	48M01
			Vanadium (Unfiltered)	10	ug/L	1	1	37	37	53M03
			Xylenes (total)	0.85	ug/L	9	3	1.62	929	48M01
			Zinc (Filtered)	2	ug/L	1	1	30	30	53M03
			Zinc (Unfiltered)	2	ug/L	1	1	72.4	72.4	53M03

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
48	Water	Stage 4	1,2-Dimethylbenzene	1	ug/L	21	8	5	1300	48FW12
			1,3-Dimethylbenzene	1	ug/L	21	9	5	3300	48FW12
			2,4-Dimethylphenol	2	ug/L	9	.	.	.	
			2-Methylnaphthalene	1	ug/L	9	3	24	140	48M01
			Benzene	1	ug/L	30	9	3.01	7100	48FW11
			Bis(2-ethylhexyl) phthalate	2	ug/L	9	1	52	52	48M07
			Butylbenzylphthalate	1.5	ug/L	9	.	.	.	
			Chlorobenzene	0.4	ug/L	9	.	.	.	
			Di-n-octylphthalate	2.4	ug/L	9	.	.	.	
			Ethylbenzene	1	ug/L	30	10	3	950	48FW12
			Fluorene	1	ug/L	9	.	.	.	
			Naphthalene	1	ug/L	9	3	24	270	48M01
			Phenanthrene	1	ug/L	9	.	.	.	
			TPH	200	ug/L	9	4	300	400000	48M02
			Toluene	1	ug/L	30	10	1	6600	48FW11
			Xylenes (total)	0.4	ug/L	9	2	1550	1990	53M03
			trans-1,2-Dichloroethylene	1	ug/L	21	2	17	490	48FW12

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
48	Water	1993	0,0,0-Triethyl phosphorothioate	10	ug/L	7	.	.	.	
			0,0-Diethyl 0-2-pyrazinyl phosphorothio	10	ug/L	7	.	.	.	
			1,1,1-Trichloroethane	0.5	ug/L	14	.	.	.	
			1,1,2-Trichloroethane	0.5	ug/L	14	1	0.067	0.067	48MW8
			1,1-Dichloroethane	1	ug/L	14	.	.	.	
			1,2,4,5-Tetrachlorobenzene	10	ug/L	7	.	.	.	
			1,2,4-Trichlorobenzene	10	ug/L	7	.	.	.	
			1,2-Dichlorobenzene	10	ug/L	7	.	.	.	
			1,2-Dichloroethane	0.5	ug/L	14	2	2.2	2.4	53M03
			1,3-Dichlorobenzene	10	ug/L	7	.	.	.	
			1,4-Dichlorobenzene	2	ug/L	14	1	0.41	0.41	48MW8
			1,4-Dichlorobenzene	10	ug/L	7	.	0.41	0.41	48MW8
			1,4-Naphthoquinone	10	ug/L	7	.	.	.	
			1-Naphthylamine	10	ug/L	7	.	.	.	
			2,3,4,6-Tetrachlorophenol	10	ug/L	7	.	.	.	
			2,4,5-Trichlorophenol	10	ug/L	7	.	.	.	
			2,4,6-Trichlorophenol	10	ug/L	7	.	.	.	
			2,4-Dichlorophenol	10	ug/L	7	.	.	.	
			2,4-Dimethylphenol	10	ug/L	7	.	.	.	
			2,4-Dinitrophenol	50	ug/L	7	.	.	.	
			2,4-Dinitrotoluene	10	ug/L	7	.	.	.	
			2,6-Dichlorophenol	10	ug/L	7	.	.	.	
			2,6-Dinitrotoluene	10	ug/L	7	.	.	.	
			2-Acetylaminofluorene	10	ug/L	7	.	.	.	
			2-Chloronaphthalene	10	ug/L	7	.	.	.	
			2-Chlorophenol	10	ug/L	7	.	.	.	
			2-Methylnaphthalene	10	ug/L	7	3	80	130	48M01
			2-Methylphenol	10	ug/L	7	.	.	.	
			2-Naphthylamine	10	ug/L	7	.	.	.	
			2-Nitroaniline	50	ug/L	7	.	.	.	
			2-Nitrophenol	10	ug/L	7	.	.	.	
			2-Picoline	10	ug/L	7	.	.	.	
			3,3'-Dichlorobenzidine	20	ug/L	7	.	.	.	
			3,3'-Dimethylbenzidine	10	ug/L	7	.	.	.	
			3-Methylcholanthrene	10	ug/L	7	.	.	.	
			3-Nitroaniline	50	ug/L	7	.	.	.	
			4,6-Dinitro-o-cresol	50	ug/L	7	.	.	.	
			4-Aminobiphenyl	10	ug/L	7	.	.	.	
			4-Bromophenylphenyl ether	10	ug/L	7	.	.	.	
			4-Chloro-3-methylphenol	20	ug/L	7	.	.	.	
			4-Chloroaniline	20	ug/L	7	.	.	.	
			4-Chlorophenylphenyl ether	10	ug/L	7	.	.	.	
			4-Methylphenol	10	ug/L	7	2	6.6	7	53M03
			4-Nitroaniline	50	ug/L	7	.	.	.	
			4-Nitrophenol	50	ug/L	7	.	.	.	
			4-Nitroquinoline-1-oxide	10	ug/L	7	.	.	.	
			5-Nitro-o-toluidine	10	ug/L	7	.	.	.	
			7,12-Dimethylbenz[a]anthracene	10	ug/L	7	.	.	.	
			Acenaphthene	10	ug/L	7	.	.	.	
			Acenaphthylene	10	ug/L	7	.	.	.	
			Acetophenone	10	ug/L	7	.	.	.	
			Aluminum (Filtered)	200	ug/L	7	.	.	.	
			Aluminum (Unfiltered)	200	ug/L	7	3	54	1600	48M07
			Aniline	10	ug/L	7	.	.	.	
			Anthracene	10	ug/L	7	.	.	.	
			Antimony (Filtered)	200	ug/L	7	4	84	170	48M01
			Antimony (Unfiltered)	200	ug/L	7	7	72	130	53M03
			Aramite	10	ug/L	7	.	.	.	

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 11

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
48	Water	1993	Arsenic (Filtered)	5	ug/L	7	5	6.5	45	53M03
			Arsenic (Unfiltered)	5	ug/L	6	5	4	38	53M03
			Barium (Filtered)	20	ug/L	7	7	0.52	590	48M01
			Barium (Unfiltered)	20	ug/L	7	6	180	580	48M01
			Benzene	2	ug/L	14	9	0.12	910	48M01
			Benzo(a)anthracene	10	ug/L	7	.	.	.	
			Benzo(a)pyrene	10	ug/L	7	.	.	.	
			Benzo(b)fluoranthene	10	ug/L	7	.	.	.	
			Benzo(ghi)perylene	10	ug/L	7	.	.	.	
			Benzo(k)fluoranthene	10	ug/L	7	.	.	.	
			Benzothiazole	10	ug/L	7	.	.	.	
			Benzyl alcohol	20	ug/L	7	.	.	.	
			Beryllium (Filtered)	3	ug/L	7	3	1.9	2.3	48M01FT
			Beryllium (Unfiltered)	3	ug/L	7	2	1.9	2.3	48M01FT
			Bis(2-Chloroethoxy)methane	10	ug/L	7	.	.	.	
			Bis(2-Chloroisopropyl) ether	10	ug/L	7	.	.	.	
			Bis(2-chloroethyl) ether	10	ug/L	7	.	.	.	
			Bis(2-ethylhexyl) phthalate	10	ug/L	7	.	.	.	
			Butylbenzylphthalate	10	ug/L	7	.	.	.	
			Cadmium (Filtered)	10	ug/L	7	2	5	5.8	48M03
			Cadmium (Unfiltered)	10	ug/L	7	1	6.2	6.2	48M07
			Calcium (Filtered)	100	ug/L	7	7	100	130000	48M01
			Calcium (Unfiltered)	100	ug/L	7	7	59	130000	48M01
			Carbon tetrachloride	1	ug/L	14	.	.	.	
			Chlorobenzilate	10	ug/L	7	.	.	.	
			Chloroform	0.5	ug/L	14	.	.	.	
			Chromium (Filtered)	20	ug/L	7	3	6.8	14	48M03
			Chromium (Unfiltered)	20	ug/L	7	3	6.4	20	48M03
			Chrysene	10	ug/L	7	.	.	.	
			Cobalt (Filtered)	20	ug/L	7	3	4.4	6.6	48M01FT
			Cobalt (Unfiltered)	20	ug/L	7	3	4.4	8.6	48M03
			Copper (Filtered)	20	ug/L	7	1	7	7	48M03
			Copper (Unfiltered)	20	ug/L	7	5	3.5	14	53M03
			Di-n-butylphthalate	10	ug/L	7	.	.	.	
			Di-n-octylphthalate	10	ug/L	7	.	.	.	
			Diallate	10	ug/L	7	.	.	.	
			Dibenz[a,h]anthracene	10	ug/L	7	.	.	.	
			Dibenzofuran	10	ug/L	7	.	.	.	
			Diethylphthalate	10	ug/L	7	.	.	.	
			Dimethoate	10	ug/L	7	.	.	.	
			Dimethyl phthalate	10	ug/L	7	.	.	.	
			Diphenylamine	10	ug/L	7	.	.	.	
			Ethyl methanesulfonate	10	ug/L	7	.	.	.	
			Ethylbenzene	2	ug/L	14	7	0.12	150	48MW8
			Famphur	10	ug/L	7	.	.	.	
			Fluoranthene	10	ug/L	7	.	.	.	
			Fluorene	10	ug/L	7	.	.	.	
			Hexachlorobenzene	10	ug/L	7	.	.	.	
			Hexachlorobutadiene	10	ug/L	7	.	.	.	
			Hexachlorocyclopentadiene	10	ug/L	7	.	.	.	
			Hexachloroethane	10	ug/L	7	.	.	.	
			Hexachlorophene	10	ug/L	7	.	.	.	
			Hexachloropropene	10	ug/L	7	.	.	.	
			Indeno(1,2,3-cd)pyrene	10	ug/L	7	.	.	.	
			Iron (Filtered)	20	ug/L	7	7	20	71000	48M01

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 12

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
48	Water	1993	Iron (Unfiltered)	20	ug/L	7	7	20	70000	48M01
			Isodrin	10	ug/L	7	.	.	.	
			Isophorone	10	ug/L	7	.	.	.	
			Isosafrole	10	ug/L	7	.	.	.	
			Kepone	10	ug/L	7	.	.	.	
			Kerosene	10000	ug/L	7	.	.	.	
			Lead (Filtered)	5	ug/L	7	2	3	4	48M01
			Lead (Unfiltered)	5	ug/L	6	4	2	14	53M03
			Magnesium (Filtered)	100	ug/L	7	7	38	26000	48M01
			Magnesium (Unfiltered)	100	ug/L	7	7	26	25000	48M01
			Manganese (Filtered)	10	ug/L	7	6	1500	3900	48MW8
			Manganese (Unfiltered)	10	ug/L	7	6	2000	4500	48M03
			Mercury (Filtered)	0.2	ug/L	7	1	0.3	0.3	48MW8
			Mercury (Unfiltered)	0.2	ug/L	7	2	0.2	0.4	48MW8
			Methapyrilene	10	ug/L	7	.	.	.	
			Methyl methanesulfonate	10	ug/L	7	.	.	.	
			Methylenechloride	5	ug/L	14	4	0.069	0.25	48M03
			N-Nitroso-di-n-dipropylamine	10	ug/L	7	.	.	.	
			N-Nitrosodi-n-butylamine	10	ug/L	7	.	.	.	
			N-Nitrosodiethylamine	10	ug/L	7	.	.	.	
			N-Nitrosodimethylamine	10	ug/L	7	.	.	.	
			N-Nitrosodiphenylamine	10	ug/L	7	.	.	.	
			N-Nitrosomethylethylamine	10	ug/L	7	.	.	.	
			N-Nitrosomorpholine	10	ug/L	7	.	.	.	
			N-Nitrosopiperidine	10	ug/L	7	.	.	.	
			Naphthalene	10	ug/L	7	4	74	250	48M01
			Nickel (Filtered)	30	ug/L	7	.	.	.	
			Nickel (Unfiltered)	30	ug/L	7	1	25	25	48M03
			Nitrobenzene	10	ug/L	7	.	.	.	
			Nitrosopyrrolidine	10	ug/L	7	.	.	.	
			Parathion	10	ug/L	7	.	.	.	
			Pentachlorobenzene	10	ug/L	7	.	.	.	
			Pentachloronitrobenzene (PCNB)	10	ug/L	7	.	.	.	
			Pentachlorophenol	50	ug/L	7	.	.	.	
			Phenacetin	10	ug/L	7	.	.	.	
			Phenanthrene	10	ug/L	7	.	.	.	
			Phenol	10	ug/L	7	1	51	51	48M01
			Potassium (Filtered)	300	ug/L	7	6	3000	6000	48M01
			Potassium (Unfiltered)	300	ug/L	7	6	3000	6000	48M01
			Pronamide	10	ug/L	7	.	.	.	
			Pyrene	10	ug/L	7	.	.	.	
			Pyridine	10	ug/L	7	.	.	.	
			Safrol	10	ug/L	7	.	.	.	
			Silver (Filtered)	20	ug/L	7	4	3.9	4.6	48MW8
			Silver (Unfiltered)	20	ug/L	7	4	2.9	5.4	48M07
			Sodium (Filtered)	300	ug/L	7	7	55	11000	48M01
			Sodium (Unfiltered)	300	ug/L	7	7	110	11000	48M01
			Tetrachloroethene	0.5	ug/L	14	6	0.14	3.7	53M03
			Tetraethyl dithiopyrophosphate	10	ug/L	7	.	.	.	
			Tin (Filtered)	100	ug/L	7	.	.	.	
			Tin (Unfiltered)	100	ug/L	7	2	52	60	53M03
			Toluene	2	ug/L	14	8	0.13	820	48MW8
			Tributyl phosphate	10	ug/L	7	.	.	.	
			Trichloroethene	1	ug/L	14	10	0.18	2.1	48M07
			Tris-2-chloroethyl phosphate	10	ug/L	7	.	.	.	

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 13

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
48	Water	1993	Vanadium (Filtered)	30	ug/L	7	3	7.6	12	53M03
			Vanadium (Unfiltered)	30	ug/L	7	4	7.7	13	53M03
			Vinyl chloride	2	ug/L	14	.	.	.	
			Xylenes (total)	5	ug/L	14	7	0.34	570	48MW8
			Zinc (Filtered)	10	ug/L	7	4	4.4	20	48MW8
			Zinc (Unfiltered)	10	ug/L	7	4	7.6	20	48MW8
			alpha,alpha-Dimethylphenethylamine	10	ug/L	7	.	.	.	
			cis-1,2-Dichloroethylene	1	ug/L	14	9	0.42	1.4	48M04
			m-Cresol	10	ug/L	7	.	.	.	
			m-Dinitrobenzene	10	ug/L	7	.	.	.	
			o-Toluidine	10	ug/L	7	.	.	.	
			p-Dimethylaminoazobenzene	10	ug/L	7	.	.	.	
			p-Phenylenediamine	10	ug/L	7	.	.	.	
			sym-Trinitrobenzene	10	ug/L	7	.	.	.	
			trans-1,2-Dichloroethylene	1	ug/L	14	.	.	.	

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 14

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
49	Soil	Stage 3	4,4'-DDD	1	ug/kg	2	1	356	356	53M05
			Aluminum	14700	ug/kg	2	2	9900000	10300000	49M01
			Arsenic	6390	ug/kg	2	2	9320	9340	49M01
			Barium	330	ug/kg	2	2	92100	108000	49M01
			Benzo(a)anthracene	10	ug/kg	10	3	120	390	49M04
			Benzo(a)pyrene	9	ug/kg	10	2	140	400	49M03
			Benzo(b)fluoranthene	30	ug/kg	10	1	160	160	49M01
			Benzo(ghi)perylene	40	ug/kg	10	1	40	40	49M03
			Beryllium	320	ug/kg	2	2	925	1180	49M01
			Bis(2-ethylhexyl) phthalate	100	ug/kg	10	2	130	160	49M01
			Butylbenzylphthalate	70	ug/kg	10	1	390	390	49M04
			Calcium	5400	ug/kg	2	2	6060	5190000	49M01
			Chromium	720	ug/kg	2	2	18700	18900	49M01
			Chrysene	70	ug/kg	10	2	190	490	49M03
			Cobalt	770	ug/kg	4	4	11500	18900	49M01
			Copper	210	ug/kg	2	2	27000	34600	49M01
			DDT,PP'	1	ug/kg	2	1	76	76	53M0P
			Endosulfan I	1	ug/kg	2	.	.	.	
			Endosulfan II	1	ug/kg	2	.	.	.	
			Endosulfan sulfate	1	ug/kg	2	.	.	.	
			Fluoranthene	50	ug/kg	10	3	300	630	49M04
			Indeno(1,2,3-cd)pyrene	50	ug/kg	10	2	90	290	49M03
			Iron	8100	ug/kg	2	2	18700000	19800000	49M01
			Lead	4560	ug/kg	2	2	7390	8530	49M01
			Magnesium	4400	ug/kg	2	2	5860000	6320000	49M01
			Manganese	250	ug/kg	2	2	355000	437000	49M01
			Methylenechloride	150	ug/kg	10	5	220	1500	49M01
			Moisture	.	Percent	10	10	1.6	21.7	49M03
			Nickel	2000	ug/kg	2	2	23.6	25.6	49M01
			Phenanthrene	20	ug/kg	10	3	230	520	49M04
			Potassium	77600	ug/kg	2	2	889000	890000	49M01
			Pyrene	60	ug/kg	10	3	300	650	49M04
			Sodium	21900	ug/kg	2	2	419000	435000	49M01
			TPH	10000	ug/kg	10	4	172000	2530000	53M0P
			Vanadium	1700	ug/kg	2	2	36.6	38.7	49M01
			Zinc	610	ug/kg	2	2	59700	71600	49M01

Eielson Air Force Base, Alaska 09:04 Saturday, January 29, 1994 15
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
49	Soil	Stage 4	Moisture	.	Percent	9	9	6.9	33	49SB05
			TPH	10000	ug/kg	25	19	12000	860000	49SB03

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
49	Soil	1993	0,0,0-Triethyl phosphorothioate	660	ug/kg	8	.	.	.	
			0,0-Diethyl 0-2-pyrazinyl phosphorothio	660	ug/kg	8	.	.	.	
			1,1,1-Trichloroethane	0.5	ug/kg	9	.	.	.	
			1,1,2-Trichloroethane	0.5	ug/kg	9	.	.	.	
			1,1-Dichloroethane	1	ug/kg	9	1	2	2	DIRECTED
			1,2,4,5-Tetrachlorobenzene	660	ug/kg	8	.	.	.	
			1,2,4-Trichlorobenzene	660	ug/kg	8	.	.	.	
			1,2-Dichlorobenzene	660	ug/kg	8	.	.	.	
			1,2-Dichloroethane	0.5	ug/kg	9	.	.	.	
			1,3-Dichlorobenzene	660	ug/kg	8	.	.	.	
			1,4-Dichlorobenzene	2	ug/kg	9	1	0.39	0.39	SUMP53M05
			1,4-Dichlorobenzene	660	ug/kg	8	.	0.39	0.39	SUMP53M05
			1,4-Naphthoquinone	660	ug/kg	8	.	.	.	
			1-Naphthylamine	660	ug/kg	8	.	.	.	
			2,3,4,6-Tetrachlorophenol	660	ug/kg	8	.	.	.	
			2,4,5-Trichlorophenol	660	ug/kg	8	.	.	.	
			2,4,6-Trichlorophenol	660	ug/kg	8	.	.	.	
			2,4-Dichlorophenol	660	ug/kg	8	.	.	.	
			2,4-Dimethylphenol	660	ug/kg	8	.	.	.	
			2,4-Dinitrophenol	3300	ug/kg	8	.	.	.	
			2,4-Dinitrotoluene	660	ug/kg	8	.	.	.	
			2,6-Dichlorophenol	660	ug/kg	8	.	.	.	
			2,6-Dinitrotoluene	660	ug/kg	8	.	.	.	
			2-Acetylaminofluorene	660	ug/kg	8	.	.	.	
			2-Chloronaphthalene	660	ug/kg	8	.	.	.	
			2-Chlorophenol	660	ug/kg	8	.	.	.	
			2-Methylnaphthalene	660	ug/kg	8	1	220	220	SLOUGH
			2-Methylphenol	660	ug/kg	8	.	.	.	
			2-Naphthylamine	660	ug/kg	8	.	.	.	
			2-Nitroaniline	3300	ug/kg	8	.	.	.	
			2-Nitrophenol	660	ug/kg	8	.	.	.	
			2-Picoline	660	ug/kg	8	.	.	.	
			3,3'-Dichlorobenzidine	1300	ug/kg	8	.	.	.	
			3,3'-Dimethylbenzidine	660	ug/kg	8	.	.	.	
			3-Methylcholanthrene	660	ug/kg	8	.	.	.	
			3-Nitroaniline	3300	ug/kg	8	.	.	.	
			4,4'-DDD	20	ug/kg	6	6	22	1000	GARRISON S
			4,4'-DDE	10	ug/kg	6	4	40	240	COMPOSITE
			4,4'-DDT	20	ug/kg	6	4	60	2900	COMPOSITE
			4,6-Dinitro-o-cresol	3300	ug/kg	8	.	.	.	
			4-Aminobiphenyl	660	ug/kg	8	.	.	.	
			4-Bromophenylphenyl ether	660	ug/kg	8	.	.	.	
			4-Chloro-3-methylphenol	1300	ug/kg	8	.	.	.	
			4-Chloroaniline	1300	ug/kg	8	.	.	.	
			4-Chlorophenylphenyl ether	660	ug/kg	8	.	.	.	
			4-Methylphenol	660	ug/kg	8	.	.	.	
			4-Nitroaniline	3300	ug/kg	8	.	.	.	
			4-Nitrophenol	3300	ug/kg	8	.	.	.	
			4-Nitroquinoline-1-oxide	660	ug/kg	8	.	.	.	
			5-Nitro-o-toluidine	660	ug/kg	8	.	.	.	
			7,12-Dimethylbenz[a]anthracene	660	ug/kg	8	.	.	.	
			Acenaphthene	660	ug/kg	8	1	1000	1000	SLOUGH
			Acenaphthylene	660	ug/kg	8	.	.	.	
			Acetophenone	660	ug/kg	8	.	.	.	
			Aldrin	10	ug/kg	6	1	1.5	1.5	SUMP
			Alpha-BHC	10	ug/kg	6	2	0.34	0.35	GARRISON S
			Aluminum	20000	ug/kg	3	3	8300000	11000000	SLOUGH
			Aniline	660	ug/kg	8	.	.	.	

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
49	Soil	1993	Anthracene	660	ug/kg	8	1	2300	2300	SLOUGH
			Antimony	20000	ug/kg	3	.	.	.	
			Aramite	660	ug/kg	8	.	.	.	
			Aroclor-1016	100	ug/kg	6	.	.	.	
			Aroclor-1221	200	ug/kg	6	.	.	.	
			Aroclor-1232	200	ug/kg	6	.	.	.	
			Aroclor-1242	100	ug/kg	6	.	.	.	
			Aroclor-1248	100	ug/kg	6	.	.	.	
			Aroclor-1254	100	ug/kg	6	.	.	.	
			Aroclor-1260	100	ug/kg	6	.	.	.	
			Arsenic	500	ug/kg	3	3	2500	5600	GARRISON S
			Barium	2000	ug/kg	3	3	86000	96000	SLOUGH
			Benzene	2	ug/kg	9	2	0.43	0.56	SUMP53M05
			Benzo(a)anthracene	660	ug/kg	8	2	470	4600	SLOUGH
			Benzo(a)pyrene	660	ug/kg	8	2	550	6200	SLOUGH
			Benzo(b)fluoranthene	660	ug/kg	8	2	500	6500	SLOUGH
			Benzo(ghi)perylene	660	ug/kg	8	2	300	4400	SLOUGH
			Benzo(k)fluoranthene	660	ug/kg	8	2	530	5300	SLOUGH
			Benzothiazole	660	ug/kg	8	.	.	.	
			Benzyl alcohol	1300	ug/kg	8	.	.	.	
			Beryllium	300	ug/kg	3	.	.	.	
			Beta-BHC	10	ug/kg	6	2	0.44	1.7	SUMP53M05
			Bis(2-Chloroethoxy)methane	660	ug/kg	8	.	.	.	
			Bis(2-Chloroisopropyl) ether	660	ug/kg	8	.	.	.	
			Bis(2-chloroethyl) ether	660	ug/kg	8	.	.	.	
			Bis(2-ethylhexyl) phthalate	660	ug/kg	8	3	120	860	DIRECTED
			Butylbenzylphthalate	660	ug/kg	8	.	.	.	
			Cadmium	1000	ug/kg	3	.	.	.	
			Calcium	10000	ug/kg	3	3	3400000	5100000	SLOUGH
			Carbon tetrachloride	1	ug/kg	9	.	.	.	
			Chlordane	50	ug/kg	6	4	170	2100	COMPOSITE
			Chlorobenzilate	660	ug/kg	8	.	.	.	
			Chloroform	0.5	ug/kg	9	.	.	.	
			Chromium	2000	ug/kg	3	3	18000	19000	GARRISON S
			Chrysene	660	ug/kg	8	2	620	6300	SLOUGH
			Cobalt	2000	ug/kg	3	3	5000	7000	SLOUGH
			Copper	2000	ug/kg	3	3	22000	27000	GARRISON S
			Delta-BHC	20	ug/kg	6	.	.	.	
			Di-n-butylphthalate	660	ug/kg	8	2	140	160	GARRISON S
			Di-n-octylphthalate	660	ug/kg	8	.	.	.	
			Diallate	660	ug/kg	8	.	.	.	
			Dibenz[a,h]anthracene	660	ug/kg	8	1	1500	1500	SLOUGH
			Dibenzofuran	660	ug/kg	8	1	770	770	SLOUGH
			Dieldrin	10	ug/kg	6	1	30	30	COMPOSITE
			Diethylphthalate	660	ug/kg	8	1	170	170	SLOUGH
			Dimethoate	660	ug/kg	8	.	.	.	
			Dimethyl phthalate	660	ug/kg	8	.	.	.	
			Diphenylamine	660	ug/kg	8	.	.	.	
			Endosulfan I	10	ug/kg	6	.	.	.	
			Endosulfan II	10	ug/kg	6	.	.	.	
			Endosulfan sulfate	20	ug/kg	6	.	.	.	
			Endrin	10	ug/kg	6	.	.	.	
			Endrin Aldehyde	50	ug/kg	6	.	.	.	
			Ethyl methanesulfonate	660	ug/kg	8	.	.	.	
			Ethylbenzene	2	ug/kg	9	2	1.1	2.9	SUMP53M05

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
49	Soil	1993	Famphur	660	ug/kg	8	.	.	.	
			Fluoranthene	660	ug/kg	8	2	970	14000	SLOUGH
			Fluorene	660	ug/kg	8	1	1400	1400	SLOUGH
			Gamma-BHC (Lindane)	10	ug/kg	6	.	.	.	
			Heptachlor	10	ug/kg	6	3	3	7.1	COMPOSITE
			Heptachlor epoxide	60	ug/kg	6	1	14	14	COMPOSITE
			Hexachlorobenzene	660	ug/kg	8	.	.	.	
			Hexachlorobutadiene	660	ug/kg	8	.	.	.	
			Hexachlorocyclopentadiene	660	ug/kg	8	.	.	.	
			Hexachloroethane	660	ug/kg	8	.	.	.	
			Hexachlorophene	660	ug/kg	8	.	.	.	
			Hexachloropropene	660	ug/kg	8	.	.	.	
			Indeno(1,2,3-cd)pyrene	660	ug/kg	8	2	300	4300	SLOUGH
			Iron	2000	ug/kg	3	3	12000000	16000000	SLOUGH
			Isodrin	660	ug/kg	8	.	.	.	
			Isophorone	660	ug/kg	8	.	.	.	
			Isosafrole	660	ug/kg	8	.	.	.	
			Kepone	660	ug/kg	8	.	.	.	
			Kerosene	660	ug/kg	8	1	63	63	SLOUGH
			Lead	500	ug/kg	3	3	11000	22000	SLOUGH
			Magnesium	10000	ug/kg	3	3	3000000	4800000	SLOUGH
			Manganese	1000	ug/kg	3	3	170000	230000	GARRISON S
			Mercury	400	ug/kg	3	.	.	.	
			Methapyrilene	660	ug/kg	8	.	.	.	
			Methoxychlor	100	ug/kg	6	1	13	13	SLOUGH
			Methyl methanesulfonate	660	ug/kg	8	.	.	.	
			Methylenechloride	5	ug/kg	9	.	.	.	
			N-Nitroso-di-n-dipropylamine	660	ug/kg	8	.	.	.	
			N-Nitrosodi-n-butylamine	660	ug/kg	8	.	.	.	
			N-Nitrosodiethylamine	660	ug/kg	8	.	.	.	
			N-Nitrosodimethylamine	660	ug/kg	8	.	.	.	
			N-Nitrosodiphenylamine	660	ug/kg	8	.	.	.	
			N-Nitrosomethylethylamine	660	ug/kg	8	.	.	.	
			N-Nitrosomorpholine	660	ug/kg	8	.	.	.	
			N-Nitrosopiperidine	660	ug/kg	8	.	.	.	
			Naphthalene	660	ug/kg	8	.	.	.	
			Nickel	3000	ug/kg	3	3	13000	18000	SLOUGH
			Nitrobenzene	660	ug/kg	8	.	.	.	
			Nitrosopyrrolidine	660	ug/kg	8	.	.	.	
			Parathion	660	ug/kg	8	.	.	.	
			Pentachlorobenzene	660	ug/kg	8	.	.	.	
			Pentachloronitrobenzene (PCNB)	660	ug/kg	8	.	.	.	
			Pentachlorophenol	3300	ug/kg	8	.	.	.	
			Phenacetin	660	ug/kg	8	.	.	.	
			Phenanthrene	660	ug/kg	8	2	550	12000	SLOUGH
			Phenol	660	ug/kg	8	.	.	.	
			Potassium	30000	ug/kg	3	3	720000	1500000	GARRISON S
			Pronamide	660	ug/kg	8	.	.	.	
			Pyrene	660	ug/kg	8	2	970	10000	SLOUGH
			Pyridine	660	ug/kg	8	3	250	610	GARRISON S
			Safrol	660	ug/kg	8	.	.	.	
			Silver	2000	ug/kg	3	3	1600	2000	SLOUGH
			Sodium	30000	ug/kg	3	3	360000	660000	SLOUGH
			TPH-diesel	4200	ug/kg	1	1	7600	7900	SUMP(53M05)
			TPH-diesel	5500	ug/kg	1	1	7600	7900	SUMP(53M05)

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 19

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
49	Soil	1993	TPH-gasoline	9700	ug/kg	1	.	1100	1100	SUMP
			TPH-gasoline	9700	ug/kg	1	1	1100	1100	SUMP
			Tetrachloroethene	0.5	ug/kg	9	.	.	.	
			Tetraethyl dithiopyrophosphate	660	ug/kg	8	.	.	.	
			Tin	10000	ug/kg	3	.	.	.	
			Toluene	2	ug/kg	9	8	0.23	7.5	DIRECTED
			Toxaphene	400	ug/kg	6	.	.	.	
			Tributyl phosphate	660	ug/kg	8	.	.	.	
			Trichloroethene	1	ug/kg	9	.	.	.	
			Tris-2-chloroethyl phosphate	660	ug/kg	8	.	.	.	
			Vanadium	3000	ug/kg	3	3	30000	37000	SLOUGH
			Vinyl chloride	2	ug/kg	9	.	.	.	
			Xylenes (total)	5	ug/kg	9	4	0.87	30	SUMP53M05
			Zinc	10	ug/kg	3	3	40000	120000	SLOUGH
			alpha,alpha-Dimethylphenethylamine	660	ug/kg	8	.	.	.	
			cis-1,2-Dichloroethylene	1	ug/kg	9	6	1	1	DIRECTED
			m-Cresol	660	ug/kg	8	.	.	.	
			m-Dinitrobenzene	660	ug/kg	8	.	.	.	
			o-Toluidine	660	ug/kg	8	.	.	.	
			p-Dimethylaminoazobenzene	660	ug/kg	8	.	.	.	
			p-Phenylenediamine	660	ug/kg	8	.	.	.	
			sym-Trinitrobenzene	660	ug/kg	8	.	.	.	
			trans-1,2-Dichloroethylene	1	ug/kg	9	.	.	.	

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 20

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
49	Soil Gas	Stage 3	1,3-Dimethylbenzene	10	ug/L	17	4	30	760	49SV01
			BTEX	10	ug/L	17	5	60	5860	49SV17
			Benzene	10	ug/L	17	5	10	40	49SV17
			Ethylbenzene	10	ug/L	17	3	20	5440	49SV17
			Toluene	10	ug/L	17	5	10	2080	49SV01

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 21

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
49	Water	Stage 3	1,1,1-Trichloroethane	0.2	ug/L	7	2	0.447	4.77	53M05
			1,1-Dichloroethane	0.46	ug/L	7	1	1.57	1.57	53M05
			1,2-Dichlorobenzene	0.2	ug/L	7	1	0.21	0.21	49M03
			1,3-Dichlorobenzene	0.2	ug/L	7	.	.	.	
			2-Methylnaphthalene	0.9	ug/L	7	1	117	117	49M02
			Aluminum (Unfiltered)	30	ug/L	1	1	13200	13200	53M05
			Arsenic (Filtered)	40	ug/L	1	1	10	10	53M05
			Arsenic (Unfiltered)	40	ug/L	1	1	22.4	22.4	53M05
			Barium (Filtered)	1	ug/L	1	1	300	300	53M05
			Barium (Unfiltered)	1	ug/L	1	1	418	418	53M05
			Benzene	0.15	ug/L	7	3	0.57	4.71	49M03
			Calcium (Filtered)	13	ug/L	1	1	56900	56900	53M05
			Calcium (Unfiltered)	13	ug/L	1	1	67000	67000	53M05
			Chloride	200	ug/L	1	1	2027	2027	53M05
			Chlorobenzene	0.34	ug/L	7	1	0.432	0.432	49M02
			Chloroform	0.2	ug/L	7	.	.	.	
			Chromium (Unfiltered)	10	ug/L	1	1	18.1	18.1	53M05
			Cobalt (Unfiltered)	10	ug/L	1	1	16.4	16.4	53M05
			Copper (Unfiltered)	3	ug/L	1	1	62.2	62.2	53M05
			Dibenzofuran	0.34	ug/L	7	1	0.62	0.62	49M02
			Ethylbenzene	0.46	ug/L	7	3	0.55	5.37	49M02
			Iron (Filtered)	20	ug/L	1	1	700	700	53M05
			Iron (Unfiltered)	20	ug/L	1	1	18600	18600	53M05
			Lead (Unfiltered)	1.4	ug/L	1	1	20.8	20.8	53M05
			Magnesium (Filtered)	44	ug/L	1	1	12400	12400	53M05
			Magnesium (Unfiltered)	44	ug/L	1	1	18100	18100	53M05
			Manganese (Filtered)	1.4	ug/L	1	1	2400	2400	53M05
			Manganese (Unfiltered)	1.4	ug/L	1	1	2960	2960	53M05
			Methylenechloride	1.31	ug/L	7	7	1310	1310	49M01
			Naphthalene	0.26	ug/L	7	2	6.2	62	49M02
			Nickel (Unfiltered)	20	ug/L	1	1	26.2	26.2	53M05
			Potassium (Filtered)	408	ug/L	1	1	2940	2940	53M05
			Potassium (Unfiltered)	408	ug/L	1	1	5760	5760	53M05
			Residue, DISS	1000	ug/L	7	7	30400	322000	49M03
			Sodium (Filtered)	82	ug/L	1	1	5010	5010	53M05
			Sodium (Unfiltered)	82	ug/L	1	1	6840	6840	53M05
			Sulfate	500	ug/L	1	1	63810	63810	53M05
			TPH	100	ug/L	7	1	28400	28400	49M02
			Toluene	0.25	ug/L	7	2	0.31	0.49	49M02
			Trichloromonofluoromethane	0.32	ug/L	7	1	0.788	0.788	49M01
			Vanadium (Unfiltered)	10	ug/L	1	1	28.2	28.2	53M05
			Xylenes (total)	0.85	ug/L	7	2	3.99	18.1	49M02
			Zinc (Filtered)	2	ug/L	1	1	60	60	53M05
			Zinc (Unfiltered)	2	ug/L	1	1	79.9	79.9	53M05
			trans-1,2-Dichloroethylene	0.38	ug/L	7	1	0.4	0.4	53M05

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 22

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
49	Water	Stage 4	1,1,1-Trichloroethane	0.2	ug/L	7	4	0.333	1.16	53M05
			1,1-Dichloroethane	0.4	ug/L	7	2	0.457	1.01	49M05
			1,2-Dichlorobenzene	0.5	ug/L	6	.	.	.	
			1,2-Dimethylbenzene	1	ug/L	20	3	2	24	49FW03
			1,3-Dichlorobenzene	1	ug/L	6	.	.	.	
			1,3-Dimethylbenzene	1	ug/L	20	5	3	37	49FW03
			1,4-Dichlorobenzene	1	ug/L	7	1	4.53	4.53	49M03
			Acenaphthene	1	ug/L	7	4	1	6.43	49M02
			Anthracene	1	ug/L	7	2	0.031	0.034	49M04
			Benzene	1	ug/L	27	16	0.33	6	49FW08
			Benzo(a)anthracene	1	ug/L	7	7	0.0006	0.026	49M02
			Benzo(a)pyrene	2	ug/L	7	6	0.0006	0.015	49M02
			Benzo(b)fluoranthene	1.5	ug/L	7	7	0.0003	0.012	49M02
			Benzo(ghi)perylene	2.5	ug/L	7	4	0.001	0.023	49M03
			Benzo(k)fluoranthene	1.5	ug/L	7	6	0.0004	0.008	49M02
			Chlorobenzene	0.4	ug/L	6	.	.	.	
			Chloroform	0.2	ug/L	7	.	.	.	
			Chrysene	1	ug/L	7	4	0.01	0.03	49M04
			Dibenz[a,h]anthracene	2.5	ug/L	7	5	0.0009	0.005	49M02
			Ethylbenzene	1	ug/L	27	8	0.63	8	49FW03
			Fluoranthene	1	ug/L	7	7	0.003	0.356	49M02
			Fluorene	1	ug/L	7	5	0.142	10.8	49M02
			Indeno(1,2,3-cd)pyrene	2.5	ug/L	7	4	0.001	0.009	49M02
			Methylenechloride	1.4	ug/L	6	.	.	.	
			Naphthalene	1	ug/L	7	6	0.878	49.9	49M02
			Phenanthrene	1	ug/L	7	6	0.02	21	49M02
			Pyrene	1	ug/L	7	6	0.015	0.85	49M02
			TPH	200	ug/L	7	2	1700	32300	49M05
			Toluene	1	ug/L	27	2	0.72	0.83	49M02
			Trichloroethene	1	ug/L	27	12	0.963	6.93	49M05
			Trichloromonofluoromethane	0.4	ug/L	6	.	.	.	
			Xylenes (total)	0.4	ug/L	7	2	0.94	5.95	49M02
			trans-1,2-Dichloroethylene	1	ug/L	26	1	2	2	49FW12

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
49	Water	1993	0,0,0-Triethyl phosphorothioate	10	ug/L	8	.	.	.	
			0,0-Diethyl 0-2-pyrazinyl phosphorothio	10	ug/L	8	.	.	.	
			1,1,1-Trichloroethane	0.5	ug/L	20	8	0.34	0.63	49M05
			1,1,2-Trichloroethane	0.5	ug/L	20	.	.	.	
			1,1-Dichloroethane	1	ug/L	20	4	0.59	0.73	49M05
			1,2,4,5-Tetrachlorobenzene	10	ug/L	8	.	.	.	
			1,2,4-Trichlorobenzene	10	ug/L	8	.	.	.	
			1,2-Dichlorobenzene	10	ug/L	8	.	.	.	
			1,2-Dichloroethane	0.5	ug/L	20	.	.	.	
			1,3-Dichlorobenzene	10	ug/L	8	.	.	.	
			1,4-Dichlorobenzene	2	ug/L	20	1	0.18	0.18	49M05
			1,4-Dichlorobenzene	10	ug/L	8	.	0.18	0.18	49M05
			1,4-Naphthoquinone	10	ug/L	8	.	.	.	
			1-Naphthylamine	10	ug/L	8	.	.	.	
			2,3,4,6-Tetrachlorophenol	10	ug/L	8	.	.	.	
			2,4,5-Trichlorophenol	10	ug/L	8	.	.	.	
			2,4,6-Trichlorophenol	10	ug/L	8	.	.	.	
			2,4-Dichlorophenol	10	ug/L	8	.	.	.	
			2,4-Dimethylphenol	10	ug/L	8	.	.	.	
			2,4-Dinitrophenol	50	ug/L	8	.	.	.	
			2,4-Dinitrotoluene	10	ug/L	8	.	.	.	
			2,6-Dichlorophenol	10	ug/L	8	.	.	.	
			2,6-Dinitrotoluene	10	ug/L	8	.	.	.	
			2-Acetylaminofluorene	10	ug/L	8	.	.	.	
			2-Chloronaphthalene	10	ug/L	8	.	.	.	
			2-Chlorophenol	10	ug/L	8	.	.	.	
			2-Methylnaphthalene	10	ug/L	8	2	45	140	49M02
			2-Methylphenol	10	ug/L	8	.	.	.	
			2-Naphthylamine	10	ug/L	8	.	.	.	
			2-Nitroaniline	50	ug/L	8	.	.	.	
			2-Nitrophenol	10	ug/L	8	.	.	.	
			2-Picoline	10	ug/L	8	.	.	.	
			3,3'-Dichlorobenzidine	20	ug/L	8	.	.	.	
			3,3'-Dimethylbenzidine	10	ug/L	8	.	.	.	
			3-Methylcholanthrene	10	ug/L	8	.	.	.	
			3-Nitroaniline	50	ug/L	8	.	.	.	
			4,6-Dinitro-o-cresol	50	ug/L	8	.	.	.	
			4-Aminobiphenyl	10	ug/L	8	.	.	.	
			4-Bromophenylphenyl ether	10	ug/L	8	.	.	.	
			4-Chloro-3-methylphenol	20	ug/L	8	.	.	.	
			4-Chloroaniline	20	ug/L	8	.	.	.	
			4-Chlorophenylphenyl ether	10	ug/L	8	.	.	.	
			4-Methylphenol	10	ug/L	8	.	.	.	
			4-Nitroaniline	50	ug/L	8	.	.	.	
			4-Nitrophenol	50	ug/L	8	.	.	.	
			4-Nitroquinoline-1-oxide	10	ug/L	8	.	.	.	
			5-Nitro-o-toluidine	10	ug/L	8	.	.	.	
			7,12-Dimethylbenz[a]anthracene	10	ug/L	8	.	.	.	
			Acenaphthene	10	ug/L	8	.	.	.	
			Acenaphthylene	10	ug/L	8	.	.	.	
			Acetophenone	10	ug/L	8	1	57	57	49M02
			Aluminum (Filtered)	200	ug/L	8	3	46	70	49M02
			Aluminum (Unfiltered)	200	ug/L	8	8	61	2200	53M05
			Aniline	10	ug/L	8	.	.	.	
			Anthracene	10	ug/L	8	.	.	.	
			Antimony (Filtered)	200	ug/L	8	.	.	.	
			Antimony (Unfiltered)	200	ug/L	8	.	.	.	
			Aramite	10	ug/L	8	.	.	.	

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
49	Water	1993	Arsenic (Filtered)	5	ug/L	8	6	1	10	49M05
			Arsenic (Unfiltered)	5	ug/L	6	6	1	19	49M01
			Barium (Filtered)	20	ug/L	8	8	20	240	49M05
			Barium (Unfiltered)	20	ug/L	8	8	30	280	53M05
			Benzene	2	ug/L	20	13	0.31	8.4	49M05
			Benzo(a)anthracene	10	ug/L	8	.	.	.	
			Benzo(a)pyrene	10	ug/L	8	.	.	.	
			Benzo(b)fluoranthene	10	ug/L	8	.	.	.	
			Benzo(ghi)perylene	10	ug/L	8	.	.	.	
			Benzo(k)fluoranthene	10	ug/L	8	.	.	.	
			Benzothiazole	10	ug/L	8	.	.	.	
			Benzyl alcohol	20	ug/L	8	.	.	.	
			Beryllium (Filtered)	3	ug/L	8	.	.	.	
			Beryllium (Unfiltered)	3	ug/L	8	1	0.94	0.94	53M05
			Bis(2-Chloroethoxy)methane	10	ug/L	8	.	.	.	
			Bis(2-Chloroisopropyl) ether	10	ug/L	8	.	.	.	
			Bis(2-chloroethyl) ether	10	ug/L	8	.	.	.	
			Bis(2-ethylhexyl) phthalate	10	ug/L	8	2	520	720	49M02
			Butylbenzylphthalate	10	ug/L	8	.	.	.	
			Cadmium (Filtered)	10	ug/L	8	.	.	.	
			Cadmium (Unfiltered)	10	ug/L	8	.	.	.	
			Calcium (Filtered)	100	ug/L	8	8	17000	70000	49M02
			Calcium (Unfiltered)	100	ug/L	8	8	19000	67000	49M02
			Carbon tetrachloride	1	ug/L	20	.	.	.	
			Chlorobenzilate	10	ug/L	8	.	.	.	
			Chloroform	0.5	ug/L	20	2	0.058	8.4	49M02
			Chromium (Filtered)	20	ug/L	8	1	6	6	49M02
			Chromium (Unfiltered)	20	ug/L	8	4	5.5	8.1	53M05
			Chrysene	10	ug/L	8	.	.	.	
			Cobalt (Filtered)	20	ug/L	8	1	10	10	49M02
			Cobalt (Unfiltered)	20	ug/L	8	2	4.7	5	49M02
			Copper (Filtered)	20	ug/L	8	3	6.5	11	SLOUGH
			Copper (Unfiltered)	20	ug/L	8	6	4.3	20	49M01
			Di-n-butylphthalate	10	ug/L	8	.	.	.	
			Di-n-octylphthalate	10	ug/L	8	.	.	.	
			Diallate	10	ug/L	8	.	.	.	
			Dibenz[a,h]anthracene	10	ug/L	8	.	.	.	
			Dibenzofuran	10	ug/L	8	.	.	.	
			Diethylphthalate	10	ug/L	8	.	.	.	
			Dimethoate	10	ug/L	8	.	.	.	
			Dimethyl phthalate	10	ug/L	8	.	.	.	
			Diphenylamine	10	ug/L	8	.	.	.	
			Ethyl methanesulfonate	10	ug/L	8	.	.	.	
			Ethylbenzene	2	ug/L	20	14	0.3	21	49M02
			Famphur	10	ug/L	8	.	.	.	
			Fluoranthene	10	ug/L	8	.	.	.	
			Fluorene	10	ug/L	8	1	11	11	49M02
			Hexachlorobenzene	10	ug/L	8	.	.	.	
			Hexachlorobutadiene	10	ug/L	8	.	.	.	
			Hexachlorocyclopentadiene	10	ug/L	8	.	.	.	
			Hexachloroethane	10	ug/L	8	.	.	.	
			Hexachlorophene	10	ug/L	8	.	.	.	
			Hexachloropropene	10	ug/L	8	.	.	.	
			Indeno(1,2,3-cd)pyrene	10	ug/L	8	.	.	.	
			Iron (Filtered)	20	ug/L	8	8	140	12000	49M05

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
49	Water	1993	Iron (Unfiltered)	20	ug/L	8	8	670	19000	49M01
			Isodrin	10	ug/L	8	.	.	.	
			Isophorone	10	ug/L	8	.	.	.	
			Isosafrole	10	ug/L	8	.	.	.	
			Kepone	10	ug/L	8	.	.	.	
			Kerosene	10000	ug/L	8	3	4.2	2800	49M02
			Lead (Filtered)	5	ug/L	8	5	1	2	53M05
			Lead (Unfiltered)	5	ug/L	6	6	1	11	SLOUGH2
			Magnesium (Filtered)	100	ug/L	8	8	3700	14000	49M02
			Magnesium (Unfiltered)	100	ug/L	8	8	4000	14000	49M02
			Manganese (Filtered)	10	ug/L	8	8	50	3800	49M01
			Manganese (Unfiltered)	10	ug/L	8	8	150	4000	49M01
			Mercury (Filtered)	0.2	ug/L	8	1	0.3	0.3	49M05
			Mercury (Unfiltered)	0.2	ug/L	8	3	0.3	0.4	49M01
			Methapyrilene	10	ug/L	8	.	.	.	
			Methyl methanesulfonate	10	ug/L	8	.	.	.	
			Methylenechloride	5	ug/L	20	3	0.06	99	49M02
			N-Nitroso-di-n-dipropylamine	10	ug/L	8	.	.	.	
			N-Nitrosodi-n-butylamine	10	ug/L	8	.	.	.	
			N-Nitrosodiethylamine	10	ug/L	8	.	.	.	
			N-Nitrosodimethylamine	10	ug/L	8	.	.	.	
			N-Nitrosodiphenylamine	10	ug/L	8	.	.	.	
			N-Nitrosomethylethylamine	10	ug/L	8	.	.	.	
			N-Nitrosomorpholine	10	ug/L	8	.	.	.	
			N-Nitrosopiperidine	10	ug/L	8	.	.	.	
			Naphthalene	10	ug/L	8	.	.	.	
			Nickel (Filtered)	30	ug/L	8	1	19	19	49M02
			Nickel (Unfiltered)	30	ug/L	8	.	.	.	
			Nitrobenzene	10	ug/L	8	.	.	.	
			Nitrosopyrrolidine	10	ug/L	8	.	.	.	
			Parathion	10	ug/L	8	.	.	.	
			Pentachlorobenzene	10	ug/L	8	.	.	.	
			Pentachloronitrobenzene (PCNB)	10	ug/L	8	.	.	.	
			Pentachlorophenol	50	ug/L	8	.	.	.	
			Phenacetin	10	ug/L	8	.	.	.	
			Phenanthrene	10	ug/L	8	.	.	.	
			Phenol	10	ug/L	8	.	.	.	
			Potassium (Filtered)	300	ug/L	8	8	1000	4000	49M02
			Potassium (Unfiltered)	300	ug/L	8	8	2000	4000	49M02
			Pronamide	10	ug/L	8	.	.	.	
			Pyrene	10	ug/L	8	.	.	.	
			Pyridine	10	ug/L	8	.	.	.	
			Safrol	10	ug/L	8	.	.	.	
			Silver (Filtered)	20	ug/L	8	1	6.5	6.5	49M01
			Silver (Unfiltered)	20	ug/L	8	3	3.2	3.8	53M05
			Sodium (Filtered)	300	ug/L	8	8	1300	7500	49M01
			Sodium (Unfiltered)	300	ug/L	8	8	1200	6900	49M01
			Tetrachloroethene	0.5	ug/L	20	1	0.058	0.058	49M05
			Tetraethyl dithiopyrophosphate	10	ug/L	8	.	.	.	
			Tin (Filtered)	100	ug/L	8	.	.	.	
			Tin (Unfiltered)	100	ug/L	8	.	.	.	
			Toluene	2	ug/L	20	13	0.084	0.49	49M06
			Tributyl phosphate	10	ug/L	8	.	.	.	
			Trichloroethene	1	ug/L	20	15	0.18	23	49M02
			Tris-2-chloroethyl phosphate	10	ug/L	8	.	.	.	

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 26

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
49	Water	1993	Vanadium (Filtered)	30	ug/L	8	1	9.7	9.7	49M01
			Vanadium (Unfiltered)	30	ug/L	8	2	5.4	12	53M05
			Vinyl chloride	2	ug/L	20	7	2	2	49M01
			Xylenes (total)	5	ug/L	20	18	0.24	37	49M02
			Zinc (Filtered)	10	ug/L	8	5	5.7	150	SLOUGH2
			Zinc (Unfiltered)	10	ug/L	8	8	4.9	230	SLOUGH
			alpha,alpha-Dimethylphenethylamine	10	ug/L	8	.	.	.	
			cis-1,2-Dichloroethylene	1	ug/L	20	12	0.45	3.2	49M05
			m-Cresol	10	ug/L	8	.	.	.	
			m-Dinitrobenzene	10	ug/L	8	.	.	.	
			o-Toluidine	10	ug/L	8	.	.	.	
			p-Dimethylaminoazobenzene	10	ug/L	8	.	.	.	
			p-Phenylenediamine	10	ug/L	8	.	.	.	
			sym-Trinitrobenzene	10	ug/L	8	.	.	.	
			trans-1,2-Dichloroethylene	1	ug/L	20	2	0.19	0.27	53M05

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 27

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
50	Soil	Stage 3	2-Chlorophenol	9	ug/kg	12	1	110	110	50M02
			2-Methylnaphthalene	30	ug/kg	12	9	290	320000	50M01
			Acenaphthene	10	ug/kg	12	1	50	50	50M02
			Aluminum	14700	ug/kg	12	12	3660000	13900000	50M06
			Arsenic	6390	ug/kg	12	2	8650	18200	50M02
			Barium	330	ug/kg	12	12	80000	366000	50M03
			Benzene	44	ug/kg	12	3	680	3790	50M03
			Beryllium	320	ug/kg	12	1	620	620	50M02
			Bis(2-ethylhexyl) phthalate	100	ug/kg	12	.	.	.	
			Cadmium	455	ug/kg	12	12	660	1990	50M02
			Calcium	5400	ug/kg	12	12	1690000	5690000	50M02
			Chromium	720	ug/kg	12	12	6200	25800	50M02
			Cobalt	770	ug/kg	12	12	3890	15300	50M02
			Copper	210	ug/kg	12	12	6790	42700	50M02
			Dibenzofuran	10	ug/kg	12	4	380	11000	50M01
			Ethylbenzene	80	ug/kg	12	6	1800	170000	50M01
			Fluorene	30	ug/kg	12	3	150	12000	50M01
			Iron	8100	ug/kg	12	12	7510000	34300000	50M06
			Lead	4560	ug/kg	24	24	5050	31900	50M02
			Magnesium	4400	ug/kg	12	12	1710000	7440000	50M02
			Manganese	250	ug/kg	12	12	218000	661000	50M02
			Moisture	.	Percent	12	12	0.8	36.7	50M02
			Naphthalene	9	ug/kg	12	9	150	160000	50M01
			Nickel	2000	ug/kg	12	12	8790	38600	50M02
			Phenol	30	ug/kg	12	1	170	170	50M02
			Potassium	77600	ug/kg	12	12	496000	1720000	50M06
			Sodium	21900	ug/kg	12	12	73100	216000	50M01
			TPH	10000	ug/kg	27	16	12000	91800000	50M01
			Toluene	160	ug/kg	12	5	310	150000	50M01
			Vanadium	1700	ug/kg	12	12	7990	29000	50M02
			Xylenes (total)	80	ug/kg	12	7	200	1470000	50M01
			Zinc	610	ug/kg	12	12	38100	157000	50M02

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 28

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
50	Soil	Stage 4	2,4-Dimethylphenol	80	ug/kg	14	.	.	.	
			2-Chlorophenol	80	ug/kg	14	.	.	.	
			2-Methylnaphthalene	30	ug/kg	14	6	120	150000	50SB06
			4-Methylphenol	30	ug/kg	14	.	.	.	
			Acenaphthene	30	ug/kg	14	.	.	.	
			Acetophenone	30	ug/kg	14	1	75000	75000	50SB06
			Benzene	80	ug/kg	4	.	.	.	
			Bis(2-ethylhexyl) phthalate	50	ug/kg	14	2	80	90	50SB03
			Butylbenzylphthalate	40	ug/kg	14	.	.	.	
			Chlorobenzene	170	ug/kg	4	.	.	.	
			Chloroform	120	ug/kg	4	.	.	.	
			Chloromethane	80	ug/kg	4	.	.	.	
			Dibenzofuran	30	ug/kg	14	1	750	750	50SB05
			Diethylphthalate	40	ug/kg	14	.	.	.	
			Ethylbenzene	250	ug/kg	4	.	.	.	
			Fluorene	30	ug/kg	14	.	.	.	
			Methylenechloride	760	ug/kg	4	.	.	.	
			Moisture	.	Percent	20	20	4.7	26.2	50SB02
			N-Nitrosopiperidine	30	ug/kg	14	2	190	320	50SB09
			Naphthalene	30	ug/kg	14	4	1100	82000	50SB06
			Phenol	80	ug/kg	14	.	.	.	
			TPH	10000	ug/kg	55	35	20400	49000000	50SB06
			Toluene	170	ug/kg	4	.	.	.	
			Xylenes (total)	770	ug/kg	4	.	.	.	

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 29

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
50	Soil	1993	Aluminum	20000	ug/kg	1	1	10000000	10000000	SOIL PIT 1
			Antimony	20000	ug/kg	1	.	.	.	
			Aroclor-1016	100	ug/kg	1	.	.	.	
			Aroclor-1221	200	ug/kg	1	.	.	.	
			Aroclor-1232	200	ug/kg	1	.	.	.	
			Aroclor-1242	100	ug/kg	1	.	.	.	
			Aroclor-1248	100	ug/kg	1	.	.	.	
			Aroclor-1254	100	ug/kg	1	.	.	.	
			Aroclor-1260	100	ug/kg	1	.	.	.	
			Arsenic	500	ug/kg	1	1	11000	11000	SOIL PIT 1
			Barium	2000	ug/kg	1	1	230000	230000	SOIL PIT 1
			Beryllium	300	ug/kg	1	1	400	400	SOIL PIT 1
			Cadmium	1000	ug/kg	1	.	.	.	
			Calcium	10000	ug/kg	1	1	2800000	2800000	SOIL PIT 1
			Chromium	2000	ug/kg	1	1	21000	21000	SOIL PIT 1
			Cobalt	2000	ug/kg	1	1	10000	10000	SOIL PIT 1
			Copper	2000	ug/kg	1	1	21000	21000	SOIL PIT 1
			Iron	2000	ug/kg	1	1	22000000	22000000	SOIL PIT 1
			Lead	500	ug/kg	1	1	14000	14000	SOIL PIT 1
			Magnesium	10000	ug/kg	1	1	4100000	4100000	SOIL PIT 1
			Manganese	1000	ug/kg	1	1	230000	230000	SOIL PIT 1
			Mercury	400	ug/kg	1	.	.	.	
			Nickel	3000	ug/kg	1	1	22000	22000	SOIL PIT 1
			Potassium	30000	ug/kg	1	1	1600000	1600000	SOIL PIT 1
			Silver	2000	ug/kg	1	1	3000	3000	SOIL PIT 1
			Sodium	30000	ug/kg	1	1	110000	110000	SOIL PIT 1
			TPH-diesel	4500	ug/kg	1	1	5800	200000	TANKFARM-PIT-1
			TPH-diesel	4800	ug/kg	1	1	5800	200000	TANKFARM-PIT-1
			TPH-diesel	4900	ug/kg	1	1	5800	200000	TANKFARM-PIT-1
			TPH-diesel	5800	ug/kg	1	.	5800	200000	TANKFARM-PIT-1
			TPH-gasoline	5600	ug/kg	1	1	77000	100000	TANKFARM-PIT-1
			TPH-gasoline	6000	ug/kg	1	1	77000	100000	TANKFARM-PIT-1
			TPH-gasoline	6100	ug/kg	1	.	77000	100000	TANKFARM-PIT-1
			TPH-gasoline	7200	ug/kg	1	.	77000	100000	TANKFARM-PIT-1
			Tin	10000	ug/kg	1	.	.	.	
			Vanadium	3000	ug/kg	1	1	26000	26000	SOIL PIT 1
			Zinc	10	ug/kg	1	1	72000	72000	SOIL PIT 1

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 30

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
50	Soil Gas	Stage 3	1,3-Dimethylbenzene	10	ug/L	15	4	40	3400	50SV06
			Benzene	10	ug/L	15	3	50	170	50SV05
			Ethylbenzene	10	ug/L	15	4	30	26800	50SV06
			Toluene	10	ug/L	15	5	60	1130	50SV05
			Total BTEX	10	ug/L	15	5	280	30400	50SV06

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 31

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
50	Water	Stage 3	2,4-Dimethylphenol	0.28	ug/L	6	1	4.7	4.7	50M05
			2-Methylnaphthalene	0.9	ug/L	6	1	454	454	50M01
			Aluminum (Filtered)	30	ug/L	5	4	30	40	50M02
			Aluminum (Unfiltered)	30	ug/L	5	5	80	90600	50M06
			Arsenic (Unfiltered)	40	ug/L	5	2	50	100	50M06
			Barium (Filtered)	1	ug/L	5	5	100	700	50M04
			Barium (Unfiltered)	1	ug/L	5	5	50	4180	50M06
			Benzene	0.15	ug/L	6	3	3	65.2	50M01
			Butylbenzylphthalate	1.5	ug/L	6	3	3.7	12	50M05
			Cadmium (Unfiltered)	3	ug/L	5	3	10	20	50M06
			Calcium (Filtered)	13	ug/L	5	5	5230	59700	50M02
			Calcium (Unfiltered)	13	ug/L	5	5	51100	84200	50M06
			Chloride	200	ug/L	5	5	448	5877	50M06
			Chlorobenzene	0.34	ug/L	6	1	1.73	1.73	50M05
			Chloromethane	0.4	ug/L	6	4	0.08	1.32	50M03
			Chromium (Unfiltered)	10	ug/L	5	4	20	820	50M04
			Cobalt (Unfiltered)	10	ug/L	5	4	20	150	50M06
			Copper (Filtered)	3	ug/L	5	1	4	4	50M03
			Copper (Unfiltered)	3	ug/L	5	5	6.5	511	50M06
			Diethylphthalate	1	ug/L	6	1	6.6	6.6	50M05
			Ethylbenzene	0.46	ug/L	6	2	136	332	50M01
			Iron (Filtered)	20	ug/L	5	5	50	1000	50M01
			Iron (Unfiltered)	20	ug/L	5	5	230	309000	50M06
			Lead (Filtered)	1.4	ug/L	5	3	2	2	50M03
			Lead (Unfiltered)	1.4	ug/L	10	8	50.4	400	50M06
			Magnesium (Filtered)	44	ug/L	5	5	8390	9350	50M02
			Magnesium (Unfiltered)	44	ug/L	5	5	8580	51900	50M06
			Manganese (Filtered)	1.4	ug/L	5	5	80	5000	50M06
			Manganese (Unfiltered)	1.4	ug/L	5	5	77.6	34600	50M06
			Methylenechloride	1.31	ug/L	6	.	.	.	
			Molybdenum (Unfiltered)	10	ug/L	5	2	19.8	51.8	50M06
			Naphthalene	0.26	ug/L	6	1	540	540	50M01
			Nickel (Unfiltered)	20	ug/L	5	4	21.3	344	50M06
			Nitrite/Nitrate	10	ug/L	5	1	102	102	50M02
			Phenol	1	ug/L	6	1	6.8	6.8	50M05
			Potassium (Filtered)	408	ug/L	5	5	1100	2000	50M06
			Potassium (Unfiltered)	408	ug/L	5	5	1420	13000	50M06
			Residue, DISS	1000	ug/L	5	5	226000	316000	50M06
			Sodium (Filtered)	82	ug/L	10	10	2240	7470	50M06
			Sulfate	500	ug/L	5	5	32130	64060	50M02
			TPH	100	ug/L	6	1	119000	119000	50M01
			Toluene	0.25	ug/L	6	2	52.5	261	50M01
			Vanadium (Unfiltered)	10	ug/L	5	4	25.6	254	50M06
			Xylenes (total)	0.85	ug/L	6	2	602	1860	50M01
			Zinc (Filtered)	2	ug/L	5	4	30	60	50M03
			Zinc (Unfiltered)	2	ug/L	5	5	46.4	1180	50M06

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 32

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
50	Water	Stage 4	2,4-Dimethylphenol	2	ug/L	9	1	12	12	50M05
			2-Chlorophenol	2	ug/L	9	.	.	.	
			2-Methylnaphthalene	1	ug/L	9	3	1.3	12000	50M01
			4-Methylphenol	2	ug/L	9	.	.	.	
			Acenaphthene	1	ug/L	9	.	.	.	
			Acetophenone	1	ug/L	9	.	.	.	
			Benzene	1	ug/L	9	4	3.8	335	50M01
			Bis(2-ethylhexyl) phthalate	2	ug/L	9	1	4.1	4.1	50M02
			Butylbenzylphthalate	1.5	ug/L	9	.	.	.	
			Chlorobenzene	0.4	ug/L	9	.	.	.	
			Chloroform	0.2	ug/L	9	1	1.01	1.01	50M08
			Chloromethane	0.4	ug/L	9	.	.	.	
			Dibenzofuran	1	ug/L	9	.	.	.	
			Diethylphthalate	1	ug/L	9	.	.	.	
			Ethylbenzene	1	ug/L	9	3	0.99	2210	50M01
			Fluorene	1	ug/L	9	.	.	.	
			Methylenechloride	1.4	ug/L	9	.	.	.	
			N-Nitrosopiperidine	1	ug/L	9	.	.	.	
			Naphthalene	1	ug/L	9	2	32	5700	50M01
			Phenol	2	ug/L	9	.	.	.	
			TPH	200	ug/L	9	2	300	1980000	50M01
			Toluene	1	ug/L	29	6	2.69	2080	50M01
			Xylenes (total)	0.4	ug/L	9	3	11.3	6940	50M01

Summary of Sampling Effort and Results for Each Source Area, Media, Stage

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
50	Water	1993	0,0,0-Triethyl phosphorothioate	10	ug/L	10	.	.	.	
			0,0-Diethyl 0-2-pyrazinyl phosphorothio	10	ug/L	10	.	.	.	
			1,1,1-Trichloroethane	0.5	ug/L	17	.	.	.	
			1,1,2-Trichloroethane	0.5	ug/L	17	.	.	.	
			1,1-Dichloroethane	1	ug/L	17	.	.	.	
			1,2,4,5-Tetrachlorobenzene	10	ug/L	10	.	.	.	
			1,2,4-Trichlorobenzene	10	ug/L	10	.	.	.	
			1,2-Dichlorobenzene	10	ug/L	10	.	.	.	
			1,2-Dichloroethane	0.5	ug/L	17	1	0.43	0.43	50M05
			1,3-Dichlorobenzene	10	ug/L	10	.	.	.	
			1,4-Dichlorobenzene	2	ug/L	17	.	.	.	
			1,4-Dichlorobenzene	10	ug/L	10	.	.	.	
			1,4-Naphthoquinone	10	ug/L	10	.	.	.	
			1-Naphthylamine	10	ug/L	10	.	.	.	
			2,3,4,6-Tetrachlorophenol	10	ug/L	10	.	.	.	
			2,4,5-Trichlorophenol	10	ug/L	10	.	.	.	
			2,4,6-Trichlorophenol	10	ug/L	10	.	.	.	
			2,4-Dichlorophenol	10	ug/L	10	.	.	.	
			2,4-Dimethylphenol	10	ug/L	10	.	.	.	
			2,4-Dinitrophenol	50	ug/L	10	.	.	.	
			2,4-Dinitrotoluene	10	ug/L	10	.	.	.	
			2,6-Dichlorophenol	10	ug/L	10	.	.	.	
			2,6-Dinitrotoluene	10	ug/L	10	.	.	.	
			2-Acetylaminofluorene	10	ug/L	10	.	.	.	
			2-Chloronaphthalene	10	ug/L	10	.	.	.	
			2-Chlorophenol	10	ug/L	10	.	.	.	
			2-Methylnaphthalene	10	ug/L	10	3	14	55	50M05
			2-Methylphenol	10	ug/L	10	.	.	.	
			2-Naphthylamine	10	ug/L	10	.	.	.	
			2-Nitroaniline	50	ug/L	10	.	.	.	
			2-Nitrophenol	10	ug/L	10	.	.	.	
			2-Picoline	10	ug/L	10	.	.	.	
			3,3'-Dichlorobenzidine	20	ug/L	10	.	.	.	
			3,3'-Dimethylbenzidine	10	ug/L	10	.	.	.	
			3-Methylcholanthrene	10	ug/L	10	.	.	.	
			3-Nitroaniline	50	ug/L	10	.	.	.	
			4,6-Dinitro-o-cresol	50	ug/L	10	.	.	.	
			4-Aminobiphenyl	10	ug/L	10	.	.	.	
			4-Bromophenylphenyl ether	10	ug/L	10	.	.	.	
			4-Chloro-3-methylphenol	20	ug/L	10	.	.	.	
			4-Chloroaniline	20	ug/L	10	.	.	.	
			4-Chlorophenylphenyl ether	10	ug/L	10	.	.	.	
			4-Methylphenol	10	ug/L	10	.	.	.	
			4-Nitroaniline	50	ug/L	10	.	.	.	
			4-Nitrophenol	50	ug/L	10	.	.	.	
			4-Nitroquinoline-1-oxide	10	ug/L	10	.	.	.	
			5-Nitro-o-toluidine	10	ug/L	10	.	.	.	
			7,12-Dimethylbenz[a]anthracene	10	ug/L	10	.	.	.	
			Acenaphthene	10	ug/L	10	.	.	.	
			Acenaphthylene	10	ug/L	10	.	.	.	
			Acetophenone	10	ug/L	10	.	.	.	
			Alkalinity	50	mg/L	1	1	170	170	50M08
			Aluminum (Filtered)	200	ug/L	13	5	47	100	50M05
			Aluminum (Unfiltered)	200	ug/L	13	11	35	77000	50M08
			Aniline	10	ug/L	10	.	.	.	
			Anthracene	10	ug/L	10	.	.	.	
			Antimony (Filtered)	200	ug/L	13	.	.	.	
			Antimony (Unfiltered)	200	ug/L	13	.	.	.	

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 34

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
50	Water	1993	Aramite	10	ug/L	10	.	.	.	
			Arsenic (Filtered)	5	ug/L	13	5	1	17	50M05
			Arsenic (Unfiltered)	5	ug/L	11	8	1	31	50M08
			Barium (Filtered)	20	ug/L	13	13	0.22	420	50M05
			Barium (Unfiltered)	20	ug/L	13	13	0.22	1700	50M08
			Benzene	2	ug/L	17	9	0.18	290	50M05
			Benzo(a)anthracene	10	ug/L	10	.	.	.	
			Benzo(a)pyrene	10	ug/L	10	.	.	.	
			Benzo(b)fluoranthene	10	ug/L	10	.	.	.	
			Benzo(ghi)perylene	10	ug/L	10	.	.	.	
			Benzo(k)fluoranthene	10	ug/L	10	.	.	.	
			Benzothiazole	10	ug/L	10	.	.	.	
			Benzyl alcohol	20	ug/L	10	.	.	.	
			Beryllium (Filtered)	3	ug/L	13	2	0.82	0.9	50M05
			Beryllium (Unfiltered)	3	ug/L	13	4	2.2	4	50M06
			Bis(2-Chloroethoxy)methane	10	ug/L	10	.	.	.	
			Bis(2-Chloroisopropyl) ether	10	ug/L	10	.	.	.	
			Bis(2-chloroethyl) ether	10	ug/L	10	.	.	.	
			Bis(2-ethylhexyl) phthalate	10	ug/L	10	1	5.2	5.2	50M01
			Bromide	500	ug/L	3	.	.	.	
			Butylbenzylphthalate	10	ug/L	10	.	.	.	
			Cadmium (Filtered)	10	ug/L	13	.	.	.	
			Cadmium (Unfiltered)	10	ug/L	13	1	9.3	9.3	50M06
			Calcium (Filtered)	100	ug/L	13	13	36	140000	50M05
			Calcium (Unfiltered)	100	ug/L	13	13	33	150000	50M05
			Carbon tetrachloride	1	ug/L	17	.	.	.	
			Chloride	200	ug/L	3	3	500	2900	50M08
			Chlorobenzilate	10	ug/L	10	.	.	.	
			Chloroform	0.5	ug/L	17	2	4.9	6.7	50M01
			Chromium (Filtered)	20	ug/L	13	1	6.8	6.8	50M07
			Chromium (Unfiltered)	20	ug/L	13	7	11	200	50M08
			Chrysene	10	ug/L	10	.	.	.	
			Cobalt (Filtered)	20	ug/L	13	1	16	16	50M05
			Cobalt (Unfiltered)	20	ug/L	13	8	6.8	100	50M08
			Copper (Filtered)	20	ug/L	13	3	3.5	6.9	50M10
			Copper (Unfiltered)	20	ug/L	13	8	3.7	280	50M08
			Di-n-butylphthalate	10	ug/L	10	.	.	.	
			Di-n-octylphthalate	10	ug/L	10	.	.	.	
			Diallate	10	ug/L	10	.	.	.	
			Dibenz[a,h]anthracene	10	ug/L	10	.	.	.	
			Dibenzofuran	10	ug/L	10	.	.	.	
			Diethylphthalate	10	ug/L	10	.	.	.	
			Dimethoate	10	ug/L	10	.	.	.	
			Dimethyl phthalate	10	ug/L	10	.	.	.	
			Diphenylamine	10	ug/L	10	.	.	.	
			Ethyl methanesulfonate	10	ug/L	10	.	.	.	
			Ethylbenzene	2	ug/L	17	8	0.35	370	50M05
			Famphur	10	ug/L	10	.	.	.	
			Fluoranthene	10	ug/L	10	.	.	.	
			Fluorene	10	ug/L	10	.	.	.	
			Fluoride	100	ug/L	3	3	400	600	50M08
			Hexachlorobenzene	10	ug/L	10	.	.	.	
			Hexachlorobutadiene	10	ug/L	10	.	.	.	
			Hexachlorocyclopentadiene	10	ug/L	10	.	.	.	
			Hexachloroethane	10	ug/L	10	.	.	.	

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 35

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
50	Water	1993	Hexachlorophene	10	ug/L	10	.	.	.	
			Hexachloropropene	10	ug/L	10	.	.	.	
			Indeno(1,2,3-cd)pyrene	10	ug/L	10	.	.	.	
			Iron (Filtered)	20	ug/L	13	10	30	25000	50M05
			Iron (Unfiltered)	20	ug/L	13	12	1200	200000	50M08
			Isodrin	10	ug/L	10	.	.	.	
			Isophorone	10	ug/L	10	.	.	.	
			Isosafrole	10	ug/L	10	.	.	.	
			Kepone	10	ug/L	10	.	.	.	
			Kerosene	10000	ug/L	10	1	8.1	8.1	50M01
			Lead (Filtered)	5	ug/L	13	4	2	8.5	50M10
			Lead (Unfiltered)	5	ug/L	11	7	2	96	50M08
			Magnesium (Filtered)	100	ug/L	13	12	8200	24000	50M05
			Magnesium (Unfiltered)	100	ug/L	13	12	8400	48000	50M08
			Manganese (Filtered)	10	ug/L	13	12	80	15000	50M05
			Manganese (Unfiltered)	10	ug/L	13	12	80	17000	50M08
			Mercury (Filtered)	0.2	ug/L	13	1	0.3	0.3	50M05
			Mercury (Unfiltered)	0.2	ug/L	13	7	0.2	1.5	50M08
			Methapyrilene	10	ug/L	10	.	.	.	
			Methyl methanesulfonate	10	ug/L	10	.	.	.	
			Methylenechloride	5	ug/L	17	4	0.12	47	50M01
			N-Nitroso-di-n-dipropylamine	10	ug/L	10	.	.	.	
			N-Nitrosodi-n-butylamine	10	ug/L	10	.	.	.	
			N-Nitrosodiethylamine	10	ug/L	10	.	.	.	
			N-Nitrosodimethylamine	10	ug/L	10	.	.	.	
			N-Nitrosodiphenylamine	10	ug/L	10	.	.	.	
			N-Nitrosomethylethylamine	10	ug/L	10	.	.	.	
			N-Nitrosomorpholine	10	ug/L	10	.	.	.	
			N-Nitrosopiperidine	10	ug/L	10	.	.	.	
			Naphthalene	10	ug/L	10	3	26	190	50M05
			Nickel (Filtered)	30	ug/L	13	1	23	23	50M05
			Nickel (Unfiltered)	30	ug/L	13	6	40	230	50M08
			Nitrate	200	ug/L	3	2	50	1100	50M08
			Nitrite	200	ug/L	3	.	.	.	
			Nitrobenzene	10	ug/L	10	.	.	.	
			Nitrosopyrrolidine	10	ug/L	10	.	.	.	
			Parathion	10	ug/L	10	.	.	.	
			Pentachlorobenzene	10	ug/L	10	.	.	.	
			Pentachloronitrobenzene (PCNB)	10	ug/L	10	.	.	.	
			Pentachlorophenol	50	ug/L	10	.	.	.	
			Phenacetin	10	ug/L	10	.	.	.	
			Phenanthrene	10	ug/L	10	.	.	.	
			Phenol	10	ug/L	10	1	4.3	4.3	OLD WELL
			Phosphate	400	ug/L	3	.	.	.	
			Potassium (Filtered)	300	ug/L	13	13	740	6000	50M05
			Potassium (Unfiltered)	300	ug/L	13	12	810	10000	50M08
			Pronamide	10	ug/L	10	.	.	.	
			Pyrene	10	ug/L	10	.	.	.	
			Pyridine	10	ug/L	10	.	.	.	
			Safrol	10	ug/L	10	.	.	.	
			Silver (Filtered)	20	ug/L	13	3	3.4	5.1	50M10
			Silver (Unfiltered)	20	ug/L	13	5	4	10	50M06
			Sodium (Filtered)	300	ug/L	13	13	900	9700	50M05
			Sodium (Unfiltered)	300	ug/L	13	13	700	13000	50M02
			Sulfate	500	ug/L	3	3	36000	39000	50M08

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 36

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
50	Water	1993	Tetrachloroethene	0.5	ug/L	17	.	.	.	
			Tetraethyl dithiopyrophosphate	10	ug/L	10	.	.	.	
			Tin (Filtered)	100	ug/L	13	.	.	.	
			Tin (Unfiltered)	100	ug/L	13	.	.	.	
			Toluene	2	ug/L	17	10	0.11	140	50M01
			Total dissolved solids	10	mg/L	1	1	240	240	50M08
			Tributyl phosphate	10	ug/L	10	.	.	.	
			Trichloroethene	1	ug/L	17	.	.	.	
			Tris-2-chloroethyl phosphate	10	ug/L	10	.	.	.	
			Vanadium (Filtered)	30	ug/L	13	1	4.3	4.3	50M10
			Vanadium (Unfiltered)	30	ug/L	13	6	30	180	50M08
			Vinyl chloride	2	ug/L	17	3	2	2	50M06
			Xylenes (total)	5	ug/L	17	10	0.22	1900	50M05
			Zinc (Filtered)	10	ug/L	13	5	7.7	970	50M10
			Zinc (Unfiltered)	10	ug/L	13	10	9.5	3700	50M10
			alpha,alpha-Dimethylphenethylamine	10	ug/L	10	.	.	.	
			cis-1,2-Dichloroethylene	1	ug/L	17	.	.	.	
			m-Cresol	10	ug/L	10	.	.	.	
			m-Dinitrobenzene	10	ug/L	10	.	.	.	
			o-Toluidine	10	ug/L	10	.	.	.	
			p-Dimethylaminoazobenzene	10	ug/L	10	.	.	.	
			p-Phenylenediamine	10	ug/L	10	.	.	.	
			sym-Trinitrobenzene	10	ug/L	10	.	.	.	
			trans-1,2-Dichloroethylene	1	ug/L	17	.	.	.	

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 37

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-7	Soil	1986	1,1,2,2-Tetrachloroethane	5	ug/kg	12	.	.	.	
			1,1-Dichloroethene	5	ug/kg	12	.	.	.	
			2-Butanone	5	ug/kg	12	.	.	.	
			Benzene	5	ug/kg	12	.	.	.	
			Chlorobenzene	5	ug/kg	12	.	.	.	
			Chloroform	5	ug/kg	12	.	.	.	
			Ethylbenzene	5	ug/kg	12	.	.	.	
			Methylenechloride	5	ug/kg	12	.	.	.	
			Tetrachloroethene	5	ug/kg	12	.	.	.	
			Toluene	5	ug/kg	12	.	.	.	
			Vinyl chloride	5	ug/kg	12	.	.	.	
			Xylenes (total)	5	ug/kg	12	.	.	.	

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 38

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-7	Soil	Stage 3	2-Methylnaphthalene	30	ug/kg	1	1	40	40	53M04
			4,4'-DDE	1	ug/kg	1	.	.	.	
			Aroclor-1254	1	ug/kg	1	1	70	70	53M04
			Benzene	44	ug/kg	9	1	263	263	20M04
			Chlordane	1	ug/kg	1	.	.	.	
			Dieldrin	1	ug/kg	1	.	.	.	
			Ethylbenzene	80	ug/kg	9	.	.	.	
			Methylenechloride	150	ug/kg	9	3	510	1100	20M04
			Moisture	.	Percent	9	9	2.6	25.9	20M04
			TPH	10000	ug/kg	9	2	24800	39500	53M04
			Tetrachloroethene	90	ug/kg	9	.	.	.	
			Toluene	160	ug/kg	9	1	380	380	20M04
			Vinyl chloride	290	ug/kg	9	.	.	.	
			Xylenes (total)	80	ug/kg	9	.	.	.	

Summary of Sampling Effort and Results for Each Source Area, Media, Stage

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-7	Soil	1993	0,0,0-Triethyl phosphorothioate	660	ug/kg	5	.	.	.	
			0,0-Diethyl 0-2-pyrazinyl phosphorothio	660	ug/kg	5	.	.	.	
			1,1,1-Trichloroethane	0.5	ug/kg	3	.	.	.	
			1,1,2-Trichloroethane	0.5	ug/kg	3	.	.	.	
			1,1-Dichloroethane	1	ug/kg	3	.	.	.	
			1,2,4,5-Tetrachlorobenzene	660	ug/kg	5	.	.	.	
			1,2,4-Trichlorobenzene	660	ug/kg	5	.	.	.	
			1,2-Dichlorobenzene	660	ug/kg	5	.	.	.	
			1,2-Dichloroethane	0.5	ug/kg	3	.	.	.	
			1,3-Dichlorobenzene	660	ug/kg	5	.	.	.	
			1,4-Dichlorobenzene	2	ug/kg	3	.	.	.	
			1,4-Dichlorobenzene	660	ug/kg	5	.	.	.	
			1,4-Naphthoquinone	660	ug/kg	5	.	.	.	
			1-Naphthylamine	660	ug/kg	5	.	.	.	
			2,3,4,6-Tetrachlorophenol	660	ug/kg	5	.	.	.	
			2,4,5-Trichlorophenol	660	ug/kg	5	.	.	.	
			2,4,6-Trichlorophenol	660	ug/kg	5	.	.	.	
			2,4-Dichlorophenol	660	ug/kg	5	.	.	.	
			2,4-Dimethylphenol	660	ug/kg	5	.	.	.	
			2,4-Dinitrophenol	3300	ug/kg	5	.	.	.	
			2,4-Dinitrotoluene	660	ug/kg	5	.	.	.	
			2,6-Dichlorophenol	660	ug/kg	5	.	.	.	
			2,6-Dinitrotoluene	660	ug/kg	5	.	.	.	
			2-Acetylaminofluorene	660	ug/kg	5	.	.	.	
			2-Chloronaphthalene	660	ug/kg	5	.	.	.	
			2-Chlorophenol	660	ug/kg	5	.	.	.	
			2-Methylnaphthalene	660	ug/kg	5	.	.	.	
			2-Methylphenol	660	ug/kg	5	.	.	.	
			2-Naphthylamine	660	ug/kg	5	.	.	.	
			2-Nitroaniline	3300	ug/kg	5	.	.	.	
			2-Nitrophenol	660	ug/kg	5	.	.	.	
			2-Picoline	660	ug/kg	5	.	.	.	
			3,3'-Dichlorobenzidine	1300	ug/kg	5	.	.	.	
			3,3'-Dimethylbenzidine	660	ug/kg	5	.	.	.	
			3-Methylcholanthrene	660	ug/kg	5	.	.	.	
			3-Nitroaniline	3300	ug/kg	5	.	.	.	
			4,4'-DDD	20	ug/kg	5	3	5.8	570	COMPOSITE
			4,4'-DDE	10	ug/kg	5	2	9	230	COMPOSITE
			4,4'-DDT	20	ug/kg	5	2	2	1500	COMPOSITE
			4,6-Dinitro-o-cresol	3300	ug/kg	5	.	.	.	
			4-Aminobiphenyl	660	ug/kg	5	.	.	.	
			4-Bromophenylphenyl ether	660	ug/kg	5	.	.	.	
			4-Chloro-3-methylphenol	1300	ug/kg	5	.	.	.	
			4-Chloroaniline	1300	ug/kg	5	.	.	.	
			4-Chlorophenylphenyl ether	660	ug/kg	5	.	.	.	
			4-Methylphenol	660	ug/kg	5	.	.	.	
			4-Nitroaniline	3300	ug/kg	5	.	.	.	
			4-Nitrophenol	3300	ug/kg	5	.	.	.	
			4-Nitroquinoline-1-oxide	660	ug/kg	5	.	.	.	
			5-Nitro-o-toluidine	660	ug/kg	5	.	.	.	
			7,12-Dimethylbenz[a]anthracene	660	ug/kg	5	.	.	.	
			Acenaphthene	660	ug/kg	5	.	.	.	
			Acenaphthylene	660	ug/kg	5	.	.	.	
			Acetophenone	660	ug/kg	5	.	.	.	
			Aldrin	10	ug/kg	5	.	.	.	
			Alpha-BHC	10	ug/kg	5	.	.	.	
			Aluminum	20000	ug/kg	3	3	6400000	9100000	20MW13
			Aniline	660	ug/kg	5	.	.	.	

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-7	Soil	1993	Anthracene	660	ug/kg	5	.	.	.	
			Antimony	20000	ug/kg	3	.	.	.	
			Aramite	660	ug/kg	5	.	.	.	
			Aroclor-1016	100	ug/kg	4	.	.	.	
			Aroclor-1221	200	ug/kg	4	.	.	.	
			Aroclor-1232	200	ug/kg	4	.	.	.	
			Aroclor-1242	100	ug/kg	4	.	.	.	
			Aroclor-1248	100	ug/kg	4	.	.	.	
			Aroclor-1254	100	ug/kg	4	.	.	.	
			Aroclor-1260	100	ug/kg	4	.	.	.	
			Arsenic	500	ug/kg	3	3	3200	6300	20MW13
			Barium	2000	ug/kg	3	3	67000	88000	20MW13
			Benzene	2	ug/kg	3	.	.	.	
			Benzo(a)anthracene	660	ug/kg	5	.	.	.	
			Benzo(a)pyrene	660	ug/kg	5	.	.	.	
			Benzo(b)fluoranthene	660	ug/kg	5	.	.	.	
			Benzo(ghi)perylene	660	ug/kg	5	.	.	.	
			Benzo(k)fluoranthene	660	ug/kg	5	.	.	.	
			Benzothiazole	660	ug/kg	5	.	.	.	
			Benzyl alcohol	1300	ug/kg	5	.	.	.	
			Beryllium	300	ug/kg	3	3	140	600	POND
			Beta-BHC	10	ug/kg	5	.	.	.	
			Bis(2-Chloroethoxy)methane	660	ug/kg	5	.	.	.	
			Bis(2-Chloroisopropyl) ether	660	ug/kg	5	.	.	.	
			Bis(2-chloroethyl) ether	660	ug/kg	5	.	.	.	
			Bis(2-ethylhexyl) phthalate	660	ug/kg	5	1	500	500	20MW27
			Butylbenzylphthalate	660	ug/kg	5	.	.	.	
			Cadmium	1000	ug/kg	3	1	490	490	20MW13
			Calcium	10000	ug/kg	3	3	4700000	8200000	20MW13
			Carbon tetrachloride	1	ug/kg	3	.	.	.	
			Chlordane	50	ug/kg	5	1	2200	2200	COMPOSITE
			Chlorobenzilate	660	ug/kg	5	.	.	.	
			Chloroform	0.5	ug/kg	3	.	.	.	
			Chromium	2000	ug/kg	3	3	16000	19000	20MW13
			Chrysene	660	ug/kg	5	1	210	210	POND
			Cobalt	2000	ug/kg	3	3	6000	7000	20MW13
			Copper	2000	ug/kg	3	3	12000	22000	POND
			Delta-BHC	20	ug/kg	5	.	.	.	
			Di-n-butylphthalate	660	ug/kg	5	.	.	.	
			Di-n-octylphthalate	660	ug/kg	5	.	.	.	
			Diallate	660	ug/kg	5	.	.	.	
			Dibenz[a,h]anthracene	660	ug/kg	5	.	.	.	
			Dibenzofuran	660	ug/kg	5	.	.	.	
			Dieldrin	10	ug/kg	5	1	34	34	COMPOSITE
			Diethylphthalate	660	ug/kg	5	.	.	.	
			Dimethoate	660	ug/kg	5	.	.	.	
			Dimethyl phthalate	660	ug/kg	5	.	.	.	
			Diphenylamine	660	ug/kg	5	.	.	.	
			Endosulfan I	10	ug/kg	5	.	.	.	
			Endosulfan II	10	ug/kg	5	.	.	.	
			Endosulfan sulfate	20	ug/kg	5	.	.	.	
			Endrin	10	ug/kg	5	.	.	.	
			Endrin Aldehyde	50	ug/kg	5	.	.	.	
			Ethyl methanesulfonate	660	ug/kg	5	.	.	.	
			Ethylbenzene	2	ug/kg	3	.	.	.	

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-7	Soil	1993	Famphur	660	ug/kg	5	.	.	.	
			Fluoranthene	660	ug/kg	5	2	220	470	POND
			Fluorene	660	ug/kg	5	.	.	.	
			Gamma-BHC (Lindane)	10	ug/kg	5	.	.	.	
			Heptachlor	10	ug/kg	5	1	5.7	5.7	COMPOSITE
			Heptachlor epoxide	60	ug/kg	5	1	13	13	COMPOSITE
			Hexachlorobenzene	660	ug/kg	5	.	.	.	
			Hexachlorobutadiene	660	ug/kg	5	.	.	.	
			Hexachlorocyclopentadiene	660	ug/kg	5	.	.	.	
			Hexachloroethane	660	ug/kg	5	.	.	.	
			Hexachlorophene	660	ug/kg	5	.	.	.	
			Hexachloropropene	660	ug/kg	5	.	.	.	
			Indeno(1,2,3-cd)pyrene	660	ug/kg	5	.	.	.	
			Iron	2000	ug/kg	3	3	12000000	17000000	20MW13
			Isodrin	660	ug/kg	5	.	.	.	
			Isophorone	660	ug/kg	5	.	.	.	
			Isosafrole	660	ug/kg	5	.	.	.	
			Kepone	660	ug/kg	5	.	.	.	
			Kerosene	660	ug/kg	5	.	.	.	
			Lead	500	ug/kg	3	3	3500	7700	POND
			Magnesium	10000	ug/kg	3	3	3500000	4900000	20MW13
			Manganese	1000	ug/kg	3	3	160000	310000	20MW13
			Mercury	400	ug/kg	3	1	100	100	POND
			Methapyrilene	660	ug/kg	5	.	.	.	
			Methoxychlor	100	ug/kg	5	.	.	.	
			Methyl methanesulfonate	660	ug/kg	5	.	.	.	
			Methylenechloride	5	ug/kg	3	.	.	.	
			N-Nitroso-di-n-dipropylamine	660	ug/kg	5	.	.	.	
			N-Nitrosodi-n-butylamine	660	ug/kg	5	.	.	.	
			N-Nitrosodiethylamine	660	ug/kg	5	.	.	.	
			N-Nitrosodimethylamine	660	ug/kg	5	.	.	.	
			N-Nitrosodiphenylamine	660	ug/kg	5	.	.	.	
			N-Nitrosomethylethylamine	660	ug/kg	5	.	.	.	
			N-Nitrosomorpholine	660	ug/kg	5	.	.	.	
			N-Nitrosopiperidine	660	ug/kg	5	.	.	.	
			Naphthalene	660	ug/kg	5	.	.	.	
			Nickel	3000	ug/kg	3	3	14000	20000	20MW13
			Nitrobenzene	660	ug/kg	5	.	.	.	
			Nitrosopyrrolidine	660	ug/kg	5	.	.	.	
			Parathion	660	ug/kg	5	.	.	.	
			Pentachlorobenzene	660	ug/kg	5	.	.	.	
			Pentachloronitrobenzene (PCNB)	660	ug/kg	5	.	.	.	
			Pentachlorophenol	3300	ug/kg	5	.	.	.	
			Phenacetin	660	ug/kg	5	.	.	.	
			Phenanthrene	660	ug/kg	5	.	.	.	
			Phenol	660	ug/kg	5	.	.	.	
			Potassium	30000	ug/kg	3	3	600000	800000	20MW13
			Pronamide	660	ug/kg	5	.	.	.	
			Pyrene	660	ug/kg	5	2	190	380	POND
			Pyridine	660	ug/kg	5	.	.	.	
			Safrol	660	ug/kg	5	.	.	.	
			Silver	2000	ug/kg	3	.	.	.	
			Sodium	30000	ug/kg	3	3	390000	580000	20MW13
			TPH-diesel	4400	ug/kg	1	.	.	.	
			TPH-diesel	4700	ug/kg	1	.	.	.	

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 42

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-7	Soil	1993	TPH-gasoline	7700	ug/kg	1	.	.	.	
			TPH-gasoline	8300	ug/kg	1	.	.	.	
			Tetrachloroethene	0.5	ug/kg	3	.	.	.	
			Tetraethyl dithiopyrophosphate	660	ug/kg	5	.	.	.	
			Tin	10000	ug/kg	3	.	.	.	
			Toluene	2	ug/kg	3	1	0.18	0.18	20MW27
			Toxaphene	400	ug/kg	5	.	.	.	
			Tributyl phosphate	660	ug/kg	5	.	.	.	
			Trichloroethene	1	ug/kg	3	.	.	.	
			Tris-2-chloroethyl phosphate	660	ug/kg	5	.	.	.	
			Vanadium	3000	ug/kg	3	3	29000	51000	20MW27
			Vinyl chloride	2	ug/kg	3	.	.	.	
			Xylenes (total)	5	ug/kg	3	1	5.3	5.3	POND
			Zinc	10	ug/kg	3	3	31000	42000	20MW13
			alpha,alpha-Dimethylphenethylamine	660	ug/kg	5	.	.	.	
			cis-1,2-Dichloroethylene	1	ug/kg	3	2	1	1	20MW13
			m-Cresol	660	ug/kg	5	.	.	.	
			m-Dinitrobenzene	660	ug/kg	5	.	.	.	
			o-Toluidine	660	ug/kg	5	.	.	.	
			p-Dimethylaminoazobenzene	660	ug/kg	5	.	.	.	
			p-Phenylenediamine	660	ug/kg	5	.	.	.	
			sym-Trinitrobenzene	660	ug/kg	5	.	.	.	
			trans-1,2-Dichloroethylene	1	ug/kg	3	.	.	.	

Eielson Air Force Base, Alaska 09:04 Saturday, January 29, 1994 43
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-7	Soil Gas	Stage 3	1,3-Dimethylbenzene	10	ug/L	40	20	10	8800	20SV85
			Benzene	10	ug/L	40	18	20	272000	20SV86
			Ethylbenzene	10	ug/L	40	19	10	7640	20SV65
			Toluene	10	ug/L	40	26	10	158000	20SV61
			Total BTEX	10	ug/L	40	27	10	293000	20SV86

Eielson Air Force Base, Alaska 09:04 Saturday, January 29, 1994 44
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-7	Water	1986	1,1,2,2-Tetrachloroethane	1	ug/L	3	.	.	.	
			1,1-Dichloroethene	1	ug/L	3	.	.	.	
			2-Butanone	1	ug/L	3	.	.	.	
			Benzene	1	ug/L	4	.	.	.	
			Chlorobenzene	1	ug/L	3	.	.	.	
			Chloroform	1	ug/L	3	.	.	.	
			Ethylbenzene	1	ug/L	3	.	.	.	
			Methylenechloride	1	ug/L	3	.	.	.	
			Oil & Grease	100	ug/L	4	3	100	300	W-3
			Petroleum Oil & Grease	100	ug/L	4	3	100	300	W-3
			TOC	.	ug/L	4	4	8300	47000	W-3
			Tetrachloroethene	1	ug/L	3	.	.	.	
			Toluene	1	ug/L	3	.	.	.	
			Vinyl chloride	1	ug/L	3	.	.	.	
			Xylenes (total)	1	ug/L	3	.	.	.	

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 45

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-7	Water	Stage 3	2,4-Dimethylphenol	0.28	ug/L	7	1	13	13	20M04
			2-Methylnaphthalene	0.9	ug/L	7	3	2.8	88.9	53M04
			2-Methylphenol	0.84	ug/L	7	3	2.52	68.4	53M04
			4-Methylphenol	0.8	ug/L	7	2	5	12	53M04
			Acenaphthene	0.32	ug/L	7	.	.	.	
			Aluminum (Unfiltered)	30	ug/L	1	1	25600	25600	53M04
			Anthracene	0.52	ug/L	7	.	.	.	
			Arsenic (Filtered)	40	ug/L	2	2	10	50	53M04
			Arsenic (Unfiltered)	40	ug/L	1	1	27.5	27.5	53M04
			BIS (2-Ethylmexylphthalate)	2	ug/L	7	.	.	.	
			Barium (Filtered)	1	ug/L	1	1	200	200	53M04
			Barium (Unfiltered)	1	ug/L	1	1	579	579	53M04
			Benzene	0.15	ug/L	7	6	4.72	12000	53M04
			Benzoic acid	.	ug/L	7	1	10.7	10.7	20M04
			Benzyl alcohol	0.07	ug/L	7	1	2.78	2.78	20M04
			Calcium (Filtered)	13	ug/L	1	1	53600	53600	53M04
			Calcium (Unfiltered)	13	ug/L	1	1	65200	65200	53M04
			Chloride	200	ug/L	6	1	755	755	53M04
			Chlorobenzene	0.34	ug/L	7	.	.	.	
			Chromium (Unfiltered)	10	ug/L	1	1	40.7	40.7	53M04
			Cobalt (Unfiltered)	10	ug/L	1	1	32.8	32.8	53M04
			Copper (Unfiltered)	3	ug/L	1	1	218	218	53M04
			Dibenzofuran	0.34	ug/L	7	.	.	.	
			Ethylbenzene	0.46	ug/L	7	4	24.6	1130	20M04
			Fluoranthene	1	ug/L	7	.	.	.	
			Fluorene	0.88	ug/L	7	.	.	.	
			Iron (Filtered)	20	ug/L	1	1	3700	3700	53M04
			Iron (Unfiltered)	20	ug/L	1	1	74400	74400	53M04
			Lead (Unfiltered)	1.4	ug/L	2	2	55.6	90	53M04
			Magnesium (Filtered)	44	ug/L	1	1	13200	13200	53M04
			Magnesium (Unfiltered)	44	ug/L	1	1	22400	22400	53M04
			Manganese (Filtered)	1.4	ug/L	1	1	800	800	53M04
			Manganese (Unfiltered)	1.4	ug/L	1	1	1190	1190	53M04
			Mercury (Filtered)	0.2	ug/L	1	1	0.7	0.7	53M04
			Mercury (Unfiltered)	0.2	ug/L	1	1	0.4	0.4	53M04
			Naphthalene	0.26	ug/L	7	3	8.6	130	53M04
			Nickel (Unfiltered)	20	ug/L	1	1	57.4	57.4	53M04
			Nitrite/Nitrate	10	ug/L	7	2	12	12	20M04
			Phenanthrene	0.46	ug/L	7	.	.	.	
			Phenol	1	ug/L	7	4	2.6	140	53M04
			Potassium (Filtered)	408	ug/L	1	1	2530	2530	53M04
			Potassium (Unfiltered)	408	ug/L	1	1	7440	7440	53M04
			Pyrene	1	ug/L	7	.	.	.	
			Residue, DISS	1000	ug/L	7	7	216000	312000	53M04
			Sodium (Filtered)	82	ug/L	1	1	4580	4580	53M04
			Sodium (Unfiltered)	82	ug/L	1	1	8720	8720	53M04
			Sulfate	500	ug/L	6	1	5930	5930	53M04
			TPH	100	ug/L	7	2	4300	7600	20M04
			Toluene	0.25	ug/L	7	3	348	19700	53M04
			Trichloromonofluoromethane	0.32	ug/L	1	.	.	.	
			Vanadium (Unfiltered)	10	ug/L	1	1	72.5	72.5	53M04
			Xylenes (total)	0.85	ug/L	7	3	290	3830	53M04
			Zinc (Filtered)	2	ug/L	1	1	40	40	53M04
			Zinc (Unfiltered)	2	ug/L	1	1	191	191	53M04

Eielson Air Force Base, Alaska 09:04 Saturday, January 29, 1994 46
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-7	Water	Stage 4	1,1-Dichloroethene	5	ug/L	26	4	6	32	20FW56
			1,2-Dimethylbenzene	1	ug/L	30	2	1	2	20FW75
			1,3-Dimethylbenzene	1	ug/L	30	3	1	2	20FW74
			Benzene	1	ug/L	40	21	0.32	7170	20M04
			Chlorobenzene	0.4	ug/L	10	.	.	.	
			Ethylbenzene	1	ug/L	40	6	1	1120	53M04
			Methylenechloride	1.4	ug/L	26	5	3	5	20FW55
			TPH	200	ug/L	10	2	500	4900	20M04
			Toluene	1	ug/L	40	14	0.6	15900	53M04
			Xylenes (total)	0.4	ug/L	10	4	1.21	3820	20M04

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 47

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-7	Water	1993	0,0,0-Triethyl phosphorothioate	10	ug/L	4	.	.	.	
			0,0-Diethyl 0-2-pyrazinyl phosphorothio	10	ug/L	4	.	.	.	
			1,1,1-Trichloroethane	0.5	ug/L	13	.	.	.	
			1,1,2-Trichloroethane	0.5	ug/L	13	.	.	.	
			1,1-Dichloroethane	1	ug/L	13	.	.	.	
			1,2,4,5-Tetrachlorobenzene	10	ug/L	4	.	.	.	
			1,2,4-Trichlorobenzene	10	ug/L	4	.	.	.	
			1,2-Dichlorobenzene	10	ug/L	4	.	.	.	
			1,2-Dichloroethane	0.5	ug/L	13	.	.	.	
			1,3-Dichlorobenzene	10	ug/L	4	.	.	.	
			1,4-Dichlorobenzene	2	ug/L	13	.	.	.	
			1,4-Dichlorobenzene	10	ug/L	4	.	.	.	
			1,4-Naphthoquinone	10	ug/L	4	.	.	.	
			1-Naphthylamine	10	ug/L	4	.	.	.	
			2,3,4,6-Tetrachlorophenol	10	ug/L	4	.	.	.	
			2,4,5-Trichlorophenol	10	ug/L	4	.	.	.	
			2,4,6-Trichlorophenol	10	ug/L	4	.	.	.	
			2,4-Dichlorophenol	10	ug/L	4	.	.	.	
			2,4-Dimethylphenol	10	ug/L	4	2	22	30	20M04
			2,4-Dinitrophenol	50	ug/L	4	.	.	.	
			2,4-Dinitrotoluene	10	ug/L	4	.	.	.	
			2,6-Dichlorophenol	10	ug/L	4	.	.	.	
			2,6-Dinitrotoluene	10	ug/L	4	.	.	.	
			2-Acetylaminofluorene	10	ug/L	4	.	.	.	
			2-Chloronaphthalene	10	ug/L	4	.	.	.	
			2-Chlorophenol	10	ug/L	4	.	.	.	
			2-Methylnaphthalene	10	ug/L	4	2	40	61	53M04
			2-Methylphenol	10	ug/L	4	2	300	460	20M04
			2-Naphthylamine	10	ug/L	4	.	.	.	
			2-Nitroaniline	50	ug/L	4	.	.	.	
			2-Nitrophenol	10	ug/L	4	.	.	.	
			2-Picoline	10	ug/L	4	.	.	.	
			3,3'-Dichlorobenzidine	20	ug/L	4	.	.	.	
			3,3'-Dimethylbenzidine	10	ug/L	4	.	.	.	
			3-Methylcholanthrene	10	ug/L	4	.	.	.	
			3-Nitroaniline	50	ug/L	4	.	.	.	
			4,6-Dinitro-o-cresol	50	ug/L	4	.	.	.	
			4-Aminobiphenyl	10	ug/L	4	.	.	.	
			4-Bromophenylphenyl ether	10	ug/L	4	.	.	.	
			4-Chloro-3-methylphenol	20	ug/L	4	.	.	.	
			4-Chloroaniline	20	ug/L	4	.	.	.	
			4-Chlorophenylphenyl ether	10	ug/L	4	.	.	.	
			4-Methylphenol	10	ug/L	4	2	62	180	20M04
			4-Nitroaniline	50	ug/L	4	.	.	.	
			4-Nitrophenol	50	ug/L	4	.	.	.	
			4-Nitroquinoline-1-oxide	10	ug/L	4	.	.	.	
			5-Nitro-o-toluidine	10	ug/L	4	.	.	.	
			7,12-Dimethylbenz[a]anthracene	10	ug/L	4	.	.	.	
			Acenaphthene	10	ug/L	4	.	.	.	
			Acenaphthylene	10	ug/L	4	.	.	.	
			Acetophenone	10	ug/L	4	1	99	99	53M04
			Aluminum (Filtered)	200	ug/L	4	1	72	72	POND
			Aluminum (Unfiltered)	200	ug/L	4	3	81	1600	53M04
			Aniline	10	ug/L	4	.	.	.	
			Anthracene	10	ug/L	4	.	.	.	
			Antimony (Filtered)	200	ug/L	4	3	97	140	20MW27
			Antimony (Unfiltered)	200	ug/L	4	3	110	150	20M12
			Aramite	10	ug/L	4	.	.	.	

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-7	Water	1993	Arsenic (Filtered)	5	ug/L	4	4	1	22	20M12
			Arsenic (Unfiltered)	5	ug/L	4	4	2	71	20M12
			Barium (Filtered)	20	ug/L	4	4	30	180	20M12
			Barium (Unfiltered)	20	ug/L	4	4	30	200	53M04
			Benzene	2	ug/L	13	8	1.4	200	53M04
			Benzo(a)anthracene	10	ug/L	4	.	.	.	
			Benzo(a)pyrene	10	ug/L	4	.	.	.	
			Benzo(b)fluoranthene	10	ug/L	4	.	.	.	
			Benzo(ghi)perylene	10	ug/L	4	.	.	.	
			Benzo(k)fluoranthene	10	ug/L	4	.	.	.	
			Benzothiazole	10	ug/L	4	.	.	.	
			Benzyl alcohol	20	ug/L	4	.	.	.	
			Beryllium (Filtered)	3	ug/L	4	1	6	6	53M04
			Beryllium (Unfiltered)	3	ug/L	4	.	.	.	
			Bis(2-Chloroethoxy)methane	10	ug/L	4	.	.	.	
			Bis(2-Chloroisopropyl) ether	10	ug/L	4	.	.	.	
			Bis(2-chloroethyl) ether	10	ug/L	4	.	.	.	
			Bis(2-ethylhexyl) phthalate	10	ug/L	4	3	11	1000	53M04
			Butylbenzylphthalate	10	ug/L	4	.	.	.	
			Cadmium (Filtered)	10	ug/L	4	1	8.7	8.7	53M04
			Cadmium (Unfiltered)	10	ug/L	4	.	.	.	
			Calcium (Filtered)	100	ug/L	4	4	12000	81000	20MW27
			Calcium (Unfiltered)	100	ug/L	4	4	13000	80000	20MW27
			Carbon tetrachloride	1	ug/L	13	.	.	.	
			Chlorobenzilate	10	ug/L	4	.	.	.	
			Chloroform	0.5	ug/L	13	.	.	.	
			Chromium (Filtered)	20	ug/L	4	1	12	12	53M04
			Chromium (Unfiltered)	20	ug/L	4	1	17	17	53M04
			Chrysene	10	ug/L	4	.	.	.	
			Cobalt (Filtered)	20	ug/L	4	1	17	17	53M04
			Cobalt (Unfiltered)	20	ug/L	4	2	7.5	9	53M04
			Copper (Filtered)	20	ug/L	4	1	10	10	53M04
			Copper (Unfiltered)	20	ug/L	4	2	4.6	50	53M04
			Di-n-butylphthalate	10	ug/L	4	.	.	.	
			Di-n-octylphthalate	10	ug/L	4	.	.	.	
			Diallate	10	ug/L	4	.	.	.	
			Dibenz[a,h]anthracene	10	ug/L	4	.	.	.	
			Dibenzofuran	10	ug/L	4	.	.	.	
			Diethylphthalate	10	ug/L	4	.	.	.	
			Dimethoate	10	ug/L	4	.	.	.	
			Dimethyl phthalate	10	ug/L	4	.	.	.	
			Diphenylamine	10	ug/L	4	.	.	.	
			Ethyl methanesulfonate	10	ug/L	4	.	.	.	
			Ethylbenzene	2	ug/L	13	11	0.11	25	20M03
			Famphur	10	ug/L	4	.	.	.	
			Fluoranthene	10	ug/L	4	.	.	.	
			Fluorene	10	ug/L	4	.	.	.	
			Hexachlorobenzene	10	ug/L	4	.	.	.	
			Hexachlorobutadiene	10	ug/L	4	.	.	.	
			Hexachlorocyclopentadiene	10	ug/L	4	.	.	.	
			Hexachloroethane	10	ug/L	4	.	.	.	
			Hexachlorophene	10	ug/L	4	.	.	.	
			Hexachloropropene	10	ug/L	4	.	.	.	
			Indeno(1,2,3-cd)pyrene	10	ug/L	4	.	.	.	
			Iron (Filtered)	20	ug/L	4	4	120	9200	53M04

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-7	Water	1993	Iron (Unfiltered)	20	ug/L	4	4	180	15000	20M12
			Isodrin	10	ug/L	4	.	.	.	
			Isophorone	10	ug/L	4	.	.	.	
			Isosafrole	10	ug/L	4	.	.	.	
			Kepone	10	ug/L	4	.	.	.	
			Kerosene	10000	ug/L	4	1	390	390	53M04
			Lead (Filtered)	5	ug/L	4	.	.	.	
			Lead (Unfiltered)	5	ug/L	4	2	3	12	53M04
			Magnesium (Filtered)	100	ug/L	4	4	5900	14000	20M12
			Magnesium (Unfiltered)	100	ug/L	4	4	5900	15000	20M12
			Manganese (Filtered)	10	ug/L	4	4	20	2900	20M12
			Manganese (Unfiltered)	10	ug/L	4	4	30	1800	20M12
			Mercury (Filtered)	0.2	ug/L	4	.	.	.	
			Mercury (Unfiltered)	0.2	ug/L	4	1	0.3	0.3	53M04
			Methapyrilene	10	ug/L	4	.	.	.	
			Methyl methanesulfonate	10	ug/L	4	.	.	.	
			Methylenechloride	5	ug/L	13	12	0.067	0.29	20A-3
			N-Nitroso-di-n-dipropylamine	10	ug/L	4	.	.	.	
			N-Nitrosodi-n-butylamine	10	ug/L	4	.	.	.	
			N-Nitrosodiethylamine	10	ug/L	4	.	.	.	
			N-Nitrosodimethylamine	10	ug/L	4	.	.	.	
			N-Nitrosodiphenylamine	10	ug/L	4	.	.	.	
			N-Nitrosomethylethylamine	10	ug/L	4	.	.	.	
			N-Nitrosomorpholine	10	ug/L	4	.	.	.	
			N-Nitrosopiperidine	10	ug/L	4	.	.	.	
			Naphthalene	10	ug/L	4	2	80	85	53M04
			Nickel (Filtered)	30	ug/L	4	.	.	.	
			Nickel (Unfiltered)	30	ug/L	4	1	20	20	53M04
			Nitrobenzene	10	ug/L	4	.	.	.	
			Nitrosopyrrolidine	10	ug/L	4	.	.	.	
			Parathion	10	ug/L	4	.	.	.	
			Pentachlorobenzene	10	ug/L	4	.	.	.	
			Pentachloronitrobenzene (PCNB)	10	ug/L	4	.	.	.	
			Pentachlorophenol	50	ug/L	4	.	.	.	
			Phenacetin	10	ug/L	4	.	.	.	
			Phenanthrene	10	ug/L	4	.	.	.	
			Phenol	10	ug/L	4	2	79	170	20M04
			Potassium (Filtered)	300	ug/L	4	4	2000	9000	POND
			Potassium (Unfiltered)	300	ug/L	4	4	2000	9000	POND
			Pronamide	10	ug/L	4	.	.	.	
			Pyrene	10	ug/L	4	.	.	.	
			Pyridine	10	ug/L	4	.	.	.	
			Safrol	10	ug/L	4	.	.	.	
			Silver (Filtered)	20	ug/L	4	2	4	4.8	20MW27
			Silver (Unfiltered)	20	ug/L	4	2	4.8	5.5	53M04
			Sodium (Filtered)	300	ug/L	4	4	1100	4500	20M12
			Sodium (Unfiltered)	300	ug/L	4	4	1500	5200	20M12
			Tetrachloroethene	0.5	ug/L	13	.	.	.	
			Tetraethyl dithiopyrophosphate	10	ug/L	4	.	.	.	
			Tin (Filtered)	100	ug/L	4	.	.	.	
			Tin (Unfiltered)	100	ug/L	4	.	.	.	
			Toluene	2	ug/L	13	12	0.15	1000	53M04
			Tributyl phosphate	10	ug/L	4	.	.	.	
			Trichloroethene	1	ug/L	13	.	.	.	
			Tris-2-chloroethyl phosphate	10	ug/L	4	.	.	.	

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 50

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-7	Water	1993	Vanadium (Filtered)	30	ug/L	4	1	7.5	7.5	53M04
			Vanadium (Unfiltered)	30	ug/L	4	1	5.8	5.8	53M04
			Vinyl chloride	2	ug/L	13	12	2	2	20A-3
			Xylenes (total)	5	ug/L	13	12	1.1	89	20M03
			Zinc (Filtered)	10	ug/L	4	1	20	20	POND
			Zinc (Unfiltered)	10	ug/L	4	3	8.1	60	53M04
			alpha,alpha-Dimethylphenethylamine	10	ug/L	4	.	.	.	
			cis-1,2-Dichloroethylene	1	ug/L	13	.	.	.	
			m-Cresol	10	ug/L	4	.	.	.	
			m-Dinitrobenzene	10	ug/L	4	.	.	.	
			o-Toluidine	10	ug/L	4	.	.	.	
			p-Dimethylaminoazobenzene	10	ug/L	4	.	.	.	
			p-Phenylenediamine	10	ug/L	4	.	.	.	
			sym-Trinitrobenzene	10	ug/L	4	.	.	.	
			trans-1,2-Dichloroethylene	1	ug/L	13	.	.	.	

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 51

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-8	Soil	1986	1,1,2,2-Tetrachloroethane	5	ug/kg	11	.	.	.	
			1,1-Dichloroethene	5	ug/kg	11	.	.	.	
			1,2-Dimethylbenzene	5000	ug/kg	11	.	.	.	
			2-Butanone	5	ug/kg	11	.	.	.	
			Benzene	5	ug/kg	11	.	.	.	
			Chlorobenzene	5	ug/kg	11	.	.	.	
			Chloroform	5	ug/kg	11	.	.	.	
			Ethylbenzene	5	ug/kg	11	.	.	.	
			Methylenechloride	5	ug/kg	11	.	.	.	
			Tetrachloroethene	5	ug/kg	11	.	.	.	
			Toluene	5	ug/kg	11	.	.	.	
			Vinyl chloride	5	ug/kg	11	.	.	.	

Eielson Air Force Base, Alaska 09:04 Saturday, January 29, 1994 52
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-8	Soil	Stage 3	Benzene	44	ug/kg	2	1	3310	3310	20M06
			Ethylbenzene	80	ug/kg	2	2	390	8800	20M06
			Methylenechloride	150	ug/kg	2	1	290	290	20M06
			Moisture	.	Percent	2	2	19.6	22.5	20M06
			TPH	10000	ug/kg	2	2	283000	500000	20M06
			Tetrachloroethene	90	ug/kg	2	.	.	.	
			Toluene	160	ug/kg	2	2	3300	240000	20M06
			Vinyl chloride	290	ug/kg	2	.	.	.	
			Xylenes (total)	80	ug/kg	2	2	6830	12400	20M06

Eielson Air Force Base, Alaska 09:04 Saturday, January 29, 1994 53
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-8	Soil	Stage 4	1,1,2,2-Tetrachloroethane	170	ug/kg	13	.	.	.	
			2,4-Dimethylphenol	80	ug/kg	13	.	.	.	
			2-Methylnaphthalene	30	ug/kg	13	.	.	.	
			2-Methylphenol	30	ug/kg	13	.	.	.	
			4-Methylphenol	30	ug/kg	13	.	.	.	
			Acenaphthene	30	ug/kg	13	1	90	90	20M14
			Acenaphthylene	30	ug/kg	13	1	30	30	20M14
			Anthracene	30	ug/kg	13	1	1700	1700	20M14
			Benzo(a)anthracene	50	ug/kg	13	1	630	630	20M14
			Benzo(a)pyrene	70	ug/kg	13	1	700	700	20M14
			Benzo(b)fluoranthene	70	ug/kg	13	1	720	720	20M14
			Benzo(ghi)perylene	80	ug/kg	13	1	520	520	20M14
			Benzo(k)fluoranthene	70	ug/kg	13	1	510	510	20M14
			Benzoic acid	80	ug/kg	13	.	.	.	
			Benzyl alcohol	80	ug/kg	13	.	.	.	
			Bis(2-ethylhexyl) phthalate	50	ug/kg	13	4	90	320	20M14
			Chrysene	50	ug/kg	13	1	1100	1100	20M14
			Dibenz[a,h]anthracene	80	ug/kg	13	1	140	140	20M14
			Dibenzofuran	30	ug/kg	13	1	80	80	20M14
			Fluoranthene	30	ug/kg	13	1	1700	1700	20M14
			Fluorene	30	ug/kg	13	1	110	110	20M14
			Indeno(1,2,3-cd)pyrene	80	ug/kg	13	1	600	600	20M14
			Moisture	.	Percent	13	13	0.6	22.7	20SB05
			Naphthalene	30	ug/kg	13	.	.	.	
			Phenanthrene	30	ug/kg	13	1	1700	1700	20M14
			Phenol	80	ug/kg	13	.	.	.	
			Pyrene	30	ug/kg	13	1	1700	1700	20M14
			TPH	10000	ug/kg	51	27	10000	888000	20SB06
			Toluene	170	ug/kg	13	.	.	.	
			Xylenes (total)	770	ug/kg	13	.	.	.	

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-8	Soil	1993	0,0,0-Triethyl phosphorothioate	660	ug/kg	2	.	.	.	
			0,0-Diethyl 0-2-pyrazinyl phosphorothio	660	ug/kg	2	.	.	.	
			1,2,4,5-Tetrachlorobenzene	660	ug/kg	2	.	.	.	
			1,2,4-Trichlorobenzene	660	ug/kg	2	.	.	.	
			1,2-Dichlorobenzene	660	ug/kg	2	.	.	.	
			1,3-Dichlorobenzene	660	ug/kg	2	.	.	.	
			1,4-Dichlorobenzene	660	ug/kg	2	.	.	.	
			1,4-Naphthoquinone	660	ug/kg	2	.	.	.	
			1-Naphthylamine	660	ug/kg	2	.	.	.	
			2,3,4,6-Tetrachlorophenol	660	ug/kg	2	.	.	.	
			2,4,5-Trichlorophenol	660	ug/kg	2	.	.	.	
			2,4,6-Trichlorophenol	660	ug/kg	2	.	.	.	
			2,4-Dichlorophenol	660	ug/kg	2	.	.	.	
			2,4-Dimethylphenol	660	ug/kg	2	.	.	.	
			2,4-Dinitrophenol	3300	ug/kg	2	.	.	.	
			2,4-Dinitrotoluene	660	ug/kg	2	.	.	.	
			2,6-Dichlorophenol	660	ug/kg	2	.	.	.	
			2,6-Dinitrotoluene	660	ug/kg	2	.	.	.	
			2-Acetylaminofluorene	660	ug/kg	2	.	.	.	
			2-Chloronaphthalene	660	ug/kg	2	.	.	.	
			2-Chlorophenol	660	ug/kg	2	.	.	.	
			2-Methylnaphthalene	660	ug/kg	2	.	.	.	
			2-Methylphenol	660	ug/kg	2	.	.	.	
			2-Naphthylamine	660	ug/kg	2	.	.	.	
			2-Nitroaniline	3300	ug/kg	2	.	.	.	
			2-Nitrophenol	660	ug/kg	2	.	.	.	
			2-Picoline	660	ug/kg	2	.	.	.	
			3,3'-Dichlorobenzidine	1300	ug/kg	2	.	.	.	
			3,3'-Dimethylbenzidine	660	ug/kg	2	.	.	.	
			3-Methylcholanthrene	660	ug/kg	2	.	.	.	
			3-Nitroaniline	3300	ug/kg	2	.	.	.	
			4,4'-DDD	20	ug/kg	1	.	.	.	
			4,4'-DDE	10	ug/kg	1	.	.	.	
			4,4'-DDT	20	ug/kg	1	.	.	.	
			4,6-Dinitro-o-cresol	3300	ug/kg	2	.	.	.	
			4-Aminobiphenyl	660	ug/kg	2	.	.	.	
			4-Bromophenylphenyl ether	660	ug/kg	2	.	.	.	
			4-Chloro-3-methylphenol	1300	ug/kg	2	.	.	.	
			4-Chloroaniline	1300	ug/kg	2	.	.	.	
			4-Chlorophenylphenyl ether	660	ug/kg	2	.	.	.	
			4-Methylphenol	660	ug/kg	2	.	.	.	
			4-Nitroaniline	3300	ug/kg	2	.	.	.	
			4-Nitrophenol	3300	ug/kg	2	.	.	.	
			4-Nitroquinoline-1-oxide	660	ug/kg	2	.	.	.	
			5-Nitro-o-toluidine	660	ug/kg	2	.	.	.	
			7,12-Dimethylbenz[a]anthracene	660	ug/kg	2	.	.	.	
			Acenaphthene	660	ug/kg	2	.	.	.	
			Acenaphthylene	660	ug/kg	2	.	.	.	
			Acetophenone	660	ug/kg	2	.	.	.	
			Aldrin	10	ug/kg	1	.	.	.	
			Alpha-BHC	10	ug/kg	1	.	.	.	
			Aniline	660	ug/kg	2	.	.	.	
			Anthracene	660	ug/kg	2	.	.	.	
			Aramite	660	ug/kg	2	.	.	.	
			Aroclor-1016	100	ug/kg	1	.	.	.	
			Aroclor-1221	200	ug/kg	1	.	.	.	
			Aroclor-1232	200	ug/kg	1	.	.	.	
			Aroclor-1242	100	ug/kg	1	.	.	.	

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-8	Soil	1993	Aroclor-1248	100	ug/kg	1	.	.	.	
			Aroclor-1254	100	ug/kg	1	.	.	.	
			Aroclor-1260	100	ug/kg	1	.	.	.	
			Benzo(a)anthracene	660	ug/kg	2	1	400	400	20M14
			Benzo(a)pyrene	660	ug/kg	2	1	410	410	20M14
			Benzo(b)fluoranthene	660	ug/kg	2	1	410	410	20M14
			Benzo(ghi)perylene	660	ug/kg	2	1	250	250	20M14
			Benzo(k)fluoranthene	660	ug/kg	2	1	390	390	20M14
			Benzothiazole	660	ug/kg	2	.	.	.	
			Benzyl alcohol	1300	ug/kg	2	.	.	.	
			Beta-BHC	10	ug/kg	1	.	.	.	
			Bis(2-Chloroethoxy)methane	660	ug/kg	2	.	.	.	
			Bis(2-Chloroisopropyl) ether	660	ug/kg	2	.	.	.	
			Bis(2-chloroethyl) ether	660	ug/kg	2	.	.	.	
			Bis(2-ethylhexyl) phthalate	660	ug/kg	2	.	.	.	
			Butylbenzylphthalate	660	ug/kg	2	.	.	.	
			Chlordane	50	ug/kg	1	.	.	.	
			Chlorobenzilate	660	ug/kg	2	.	.	.	
			Chrysene	660	ug/kg	2	1	610	610	20M14
			Delta-BHC	20	ug/kg	1	.	.	.	
			Di-n-butylphthalate	660	ug/kg	2	.	.	.	
			Di-n-octylphthalate	660	ug/kg	2	.	.	.	
			Diallate	660	ug/kg	2	.	.	.	
			Dibenz[a,h]anthracene	660	ug/kg	2	.	.	.	
			Dibenzofuran	660	ug/kg	2	.	.	.	
			Dieldrin	10	ug/kg	1	.	.	.	
			Diethylphthalate	660	ug/kg	2	.	.	.	
			Dimethoate	660	ug/kg	2	.	.	.	
			Dimethyl phthalate	660	ug/kg	2	.	.	.	
			Diphenylamine	660	ug/kg	2	.	.	.	
			Endosulfan I	10	ug/kg	1	.	.	.	
			Endosulfan II	10	ug/kg	1	.	.	.	
			Endosulfan sulfate	20	ug/kg	1	.	.	.	
			Endrin	10	ug/kg	1	.	.	.	
			Endrin Aldehyde	50	ug/kg	1	.	.	.	
			Ethyl methanesulfonate	660	ug/kg	2	.	.	.	
			Famphur	660	ug/kg	2	.	.	.	
			Fluoranthene	660	ug/kg	2	1	1300	1300	20M14
			Fluorene	660	ug/kg	2	.	.	.	
			Gamma-BHC (Lindane)	10	ug/kg	1	.	.	.	
			Heptachlor	10	ug/kg	1	.	.	.	
			Heptachlor epoxide	60	ug/kg	1	.	.	.	
			Hexachlorobenzene	660	ug/kg	2	.	.	.	
			Hexachlorobutadiene	660	ug/kg	2	.	.	.	
			Hexachlorocyclopentadiene	660	ug/kg	2	.	.	.	
			Hexachloroethane	660	ug/kg	2	.	.	.	
			Hexachlorophene	660	ug/kg	2	.	.	.	
			Hexachloropropene	660	ug/kg	2	.	.	.	
			Indeno(1,2,3-cd)pyrene	660	ug/kg	2	1	260	260	20M14
			Isodrin	660	ug/kg	2	.	.	.	
			Isophorone	660	ug/kg	2	.	.	.	
			Isosafrole	660	ug/kg	2	.	.	.	
			Kepone	660	ug/kg	2	.	.	.	
			Kerosene	660	ug/kg	2	.	.	.	
			Methapyrilene	660	ug/kg	2	.	.	.	

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 56

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-8	Soil	1993	Methoxychlor	100	ug/kg	1	.	.	.	
			Methyl methanesulfonate	660	ug/kg	2	.	.	.	
			N-Nitroso-di-n-dipropylamine	660	ug/kg	2	.	.	.	
			N-Nitrosodi-n-butylamine	660	ug/kg	2	.	.	.	
			N-Nitrosodiethylamine	660	ug/kg	2	.	.	.	
			N-Nitrosodimethylamine	660	ug/kg	2	.	.	.	
			N-Nitrosodiphenylamine	660	ug/kg	2	.	.	.	
			N-Nitrosomethylethylamine	660	ug/kg	2	.	.	.	
			N-Nitrosomorpholine	660	ug/kg	2	.	.	.	
			N-Nitrosopiperidine	660	ug/kg	2	.	.	.	
			Naphthalene	660	ug/kg	2	.	.	.	
			Nitrobenzene	660	ug/kg	2	.	.	.	
			Nitrosopyrrolidine	660	ug/kg	2	.	.	.	
			Parathion	660	ug/kg	2	.	.	.	
			Pentachlorobenzene	660	ug/kg	2	.	.	.	
			Pentachloronitrobenzene (PCNB)	660	ug/kg	2	.	.	.	
			Pentachlorophenol	3300	ug/kg	2	.	.	.	
			Phenacetin	660	ug/kg	2	.	.	.	
			Phenanthrene	660	ug/kg	2	1	1100	1100	20M14
			Phenol	660	ug/kg	2	.	.	.	
			Pronamide	660	ug/kg	2	.	.	.	
			Pyrene	660	ug/kg	2	1	1100	1100	20M14
			Pyridine	660	ug/kg	2	.	.	.	
			Safrol	660	ug/kg	2	.	.	.	
			Tetraethyl dithiopyrophosphate	660	ug/kg	2	.	.	.	
			Toxaphene	400	ug/kg	1	.	.	.	
			Tributyl phosphate	660	ug/kg	2	.	.	.	
			Tris-2-chloroethyl phosphate	660	ug/kg	2	.	.	.	
			alpha,alpha-Dimethylphenethylamine	660	ug/kg	2	.	.	.	
			m-Cresol	660	ug/kg	2	.	.	.	
			m-Dinitrobenzene	660	ug/kg	2	.	.	.	
			o-Toluidine	660	ug/kg	2	.	.	.	
			p-Dimethylaminoazobenzene	660	ug/kg	2	.	.	.	
			p-Phenylenediamine	660	ug/kg	2	.	.	.	
			sym-Trinitrobenzene	660	ug/kg	2	.	.	.	

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 57

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-8	Soil Gas	Stage 3	1,3-Dimethylbenzene	10	ug/L	24	5	10	9970	20SV79
			Benzene	10	ug/L	24	5	10	9620	20SV46
			Ethylbenzene	10	ug/L	24	10	10	3550	20SV79
			Toluene	10	ug/L	24	15	10	12800	20SV79
			Total BTEX	10	ug/L	24	16	10	26500	20SV79

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 58

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-8	Water	1986	1,1,2,2-Tetrachloroethane	1	ug/L	4	.	.	.	
			1,1-Dichloroethene	1	ug/L	4	.	.	.	
			2-Butanone	1	ug/L	4	.	.	.	
			Benzene	1	ug/L	4	.	.	.	
			Chlorobenzene	1	ug/L	4	.	.	.	
			Chloroform	1	ug/L	4	.	.	.	
			Ethylbenzene	1	ug/L	4	.	.	.	
			Methylenechloride	1	ug/L	4	.	.	.	
			Oil & Grease	100	ug/L	4	2	100	200	20B-2
			Petroleum Oil & Grease	100	ug/L	4	2	100	200	20B-2
			TOC	.	ug/L	4	4	1300	13000	20B-2
			Tetrachloroethene	1	ug/L	4	.	.	.	
			Toluene	1	ug/L	4	.	.	.	
			Vinyl chloride	1	ug/L	4	.	.	.	
			Xylenes (total)	1	ug/L	4	.	.	.	

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 59

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-8	Water	Stage 3	2,4-Dimethylphenol	0.28	ug/L	1	.	.	.	
			2-Methylnaphthalene	0.9	ug/L	1	.	.	.	
			2-Methylphenol	0.84	ug/L	1	.	.	.	
			4-Methylphenol	0.8	ug/L	1	.	.	.	
			Acenaphthene	0.32	ug/L	1	.	.	.	
			Anthracene	0.52	ug/L	1	.	.	.	
			BIS (2-Ethylmexylphthalate)	2	ug/L	1	.	.	.	
			Benzene	0.15	ug/L	1	1	481	481	20M06
			Benzoic acid	.	ug/L	1	.	.	.	
			Benzyl alcohol	0.07	ug/L	1	.	.	.	
			Chloride	200	ug/L	1	.	.	.	
			Chlorobenzene	0.34	ug/L	1	1	10.6	10.6	20M06
			Dibenzofuran	0.34	ug/L	1	.	.	.	
			Ethylbenzene	0.46	ug/L	1	1	86.7	86.7	20M06
			Fluoranthene	1	ug/L	1	.	.	.	
			Fluorene	0.88	ug/L	1	.	.	.	
			Naphthalene	0.26	ug/L	1	.	.	.	
			Nitrite/Nitrate	10	ug/L	1	.	.	.	
			Phenanthrene	0.46	ug/L	1	.	.	.	
			Phenol	1	ug/L	1	.	.	.	
			Pyrene	1	ug/L	1	.	.	.	
			Residue, DISS	1000	ug/L	1	1	254000	254000	20M06
			Sulfate	500	ug/L	1	.	.	.	
			TPH	100	ug/L	1	.	.	.	
			Toluene	0.25	ug/L	1	1	939	939	20M06
			Xylenes (total)	0.85	ug/L	1	1	236	236	20M06

Eielson Air Force Base, Alaska 09:04 Saturday, January 29, 1994 60
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-8	Water	Stage 4	1,2-Dimethylbenzene	1	ug/L	44	12	1	380	20FW70
			1,3-Dimethylbenzene	1	ug/L	44	18	1	640	20FW02
			2,4-Dimethylphenol	2	ug/L	8	.	.	.	
			2-Methylnaphthalene	1	ug/L	8	1	39	39	20M06
			2-Methylphenol	2	ug/L	8	.	.	.	
			4-Methylphenol	2	ug/L	8	.	.	.	
			Acenaphthene	1	ug/L	8	.	.	.	
			Acenaphthylene	1	ug/L	8	.	.	.	
			Anthracene	1	ug/L	8	.	.	.	
			Benzene	1	ug/L	52	10	0.45	830	20FW70
			Benzo(a)anthracene	1	ug/L	8	.	.	.	
			Benzo(a)pyrene	2	ug/L	8	.	.	.	
			Benzo(b)fluoranthene	1.5	ug/L	8	.	.	.	
			Benzo(ghi)perylene	2.5	ug/L	8	.	.	.	
			Benzo(k)fluoranthene	1.5	ug/L	8	.	.	.	
			Benzoic acid	25	ug/L	8	.	.	.	
			Benzyl alcohol	2	ug/L	8	.	.	.	
			Bis(2-ethylhexyl) phthalate	2	ug/L	8	6	6.4	2900	20M06
			Chlorobenzene	0.4	ug/L	8	.	.	.	
			Chrysene	1	ug/L	8	.	.	.	
			Dibenz[a,h]anthracene	2.5	ug/L	8	.	.	.	
			Dibenzofuran	1	ug/L	8	.	.	.	
			Ethylbenzene	1	ug/L	52	4	3	470	20FW02
			Fluoranthene	1	ug/L	8	.	.	.	
			Fluorene	1	ug/L	8	.	.	.	
			Indeno(1,2,3-cd)pyrene	2.5	ug/L	8	.	.	.	
			Naphthalene	1	ug/L	8	1	25	25	20M06
			Phenanthrene	1	ug/L	8	.	.	.	
			Phenol	2	ug/L	8	.	.	.	
			Pyrene	1	ug/L	8	.	.	.	
			TPH	200	ug/L	8	1	1400	1400	20M06
			Toluene	1	ug/L	52	23	0.87	3040	20M06
			Xylenes (total)	0.4	ug/L	8	1	1550	1550	20M06

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-8	Water	1993	0,0,0-Triethyl phosphorothioate	10	ug/L	4	.	.	.	
			0,0-Diethyl 0-2-pyrazinyl phosphorothio	10	ug/L	4	.	.	.	
			1,1,1-Trichloroethane	0.5	ug/L	11	.	.	.	
			1,1,2-Trichloroethane	0.5	ug/L	11	.	.	.	
			1,1-Dichloroethane	1	ug/L	11	.	.	.	
			1,2,4,5-Tetrachlorobenzene	10	ug/L	4	.	.	.	
			1,2,4-Trichlorobenzene	10	ug/L	4	.	.	.	
			1,2-Dichlorobenzene	10	ug/L	4	.	.	.	
			1,2-Dichloroethane	0.5	ug/L	11	.	.	.	
			1,3-Dichlorobenzene	10	ug/L	4	.	.	.	
			1,4-Dichlorobenzene	2	ug/L	11	.	.	.	
			1,4-Dichlorobenzene	10	ug/L	4	.	.	.	
			1,4-Naphthoquinone	10	ug/L	4	.	.	.	
			1-Naphthylamine	10	ug/L	4	.	.	.	
			2,3,4,6-Tetrachlorophenol	10	ug/L	4	.	.	.	
			2,4,5-Trichlorophenol	10	ug/L	4	.	.	.	
			2,4,6-Trichlorophenol	10	ug/L	4	.	.	.	
			2,4-Dichlorophenol	10	ug/L	4	.	.	.	
			2,4-Dimethylphenol	10	ug/L	4	.	.	.	
			2,4-Dinitrophenol	50	ug/L	4	.	.	.	
			2,4-Dinitrotoluene	10	ug/L	4	.	.	.	
			2,6-Dichlorophenol	10	ug/L	4	.	.	.	
			2,6-Dinitrotoluene	10	ug/L	4	.	.	.	
			2-Acetylaminofluorene	10	ug/L	4	.	.	.	
			2-Chloronaphthalene	10	ug/L	4	.	.	.	
			2-Chlorophenol	10	ug/L	4	.	.	.	
			2-Methylnaphthalene	10	ug/L	4	.	.	.	
			2-Methylphenol	10	ug/L	4	.	.	.	
			2-Naphthylamine	10	ug/L	4	.	.	.	
			2-Nitroaniline	50	ug/L	4	.	.	.	
			2-Nitrophenol	10	ug/L	4	.	.	.	
			2-Picoline	10	ug/L	4	.	.	.	
			3,3'-Dichlorobenzidine	20	ug/L	4	.	.	.	
			3,3'-Dimethylbenzidine	10	ug/L	4	.	.	.	
			3-Methylcholanthrene	10	ug/L	4	.	.	.	
			3-Nitroaniline	50	ug/L	4	.	.	.	
			4,6-Dinitro-o-cresol	50	ug/L	4	.	.	.	
			4-Aminobiphenyl	10	ug/L	4	.	.	.	
			4-Bromophenylphenyl ether	10	ug/L	4	.	.	.	
			4-Chloro-3-methylphenol	20	ug/L	4	.	.	.	
			4-Chloroaniline	20	ug/L	4	.	.	.	
			4-Chlorophenylphenyl ether	10	ug/L	4	.	.	.	
			4-Methylphenol	10	ug/L	4	1	4.7	4.7	20M06
			4-Nitroaniline	50	ug/L	4	.	.	.	
			4-Nitrophenol	50	ug/L	4	.	.	.	
			4-Nitroquinoline-1-oxide	10	ug/L	4	.	.	.	
			5-Nitro-o-toluidine	10	ug/L	4	.	.	.	
			7,12-Dimethylbenz[a]anthracene	10	ug/L	4	.	.	.	
			Acenaphthene	10	ug/L	4	.	.	.	
			Acenaphthylene	10	ug/L	4	.	.	.	
			Acetophenone	10	ug/L	4	1	5.4	5.4	20M06
			Aluminum (Filtered)	200	ug/L	4	.	.	.	
			Aluminum (Unfiltered)	200	ug/L	4	3	76	300	20M14
			Aniline	10	ug/L	4	.	.	.	
			Anthracene	10	ug/L	4	.	.	.	
			Antimony (Filtered)	200	ug/L	4	2	100	140	20M06
			Antimony (Unfiltered)	200	ug/L	4	2	71	110	20M06
			Aramite	10	ug/L	4	.	.	.	

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-8	Water	1993	Arsenic (Filtered)	5	ug/L	4	3	2	5.9	20M06
			Arsenic (Unfiltered)	5	ug/L	3	2	6	8.1	20M06
			Barium (Filtered)	20	ug/L	4	4	40	90	20M06
			Barium (Unfiltered)	20	ug/L	4	4	50	150	20M15
			Benzene	2	ug/L	11	8	260	570	20M06
			Benzo(a)anthracene	10	ug/L	4	.	.	.	
			Benzo(a)pyrene	10	ug/L	4	.	.	.	
			Benzo(b)fluoranthene	10	ug/L	4	.	.	.	
			Benzo(ghi)perylene	10	ug/L	4	.	.	.	
			Benzo(k)fluoranthene	10	ug/L	4	.	.	.	
			Benzothiazole	10	ug/L	4	.	.	.	
			Benzyl alcohol	20	ug/L	4	.	.	.	
			Beryllium (Filtered)	3	ug/L	4	.	.	.	
			Beryllium (Unfiltered)	3	ug/L	4	.	.	.	
			Bis(2-Chloroethoxy)methane	10	ug/L	4	.	.	.	
			Bis(2-Chloroisopropyl) ether	10	ug/L	4	.	.	.	
			Bis(2-chloroethyl) ether	10	ug/L	4	.	.	.	
			Bis(2-ethylhexyl) phthalate	10	ug/L	4	2	6.6	7.3	20M06
			Butylbenzylphthalate	10	ug/L	4	.	.	.	
			Cadmium (Filtered)	10	ug/L	4	.	.	.	
			Cadmium (Unfiltered)	10	ug/L	4	1	5.7	5.7	20M06
			Calcium (Filtered)	100	ug/L	4	4	40000	56000	20M06
			Calcium (Unfiltered)	100	ug/L	4	4	43000	60000	20M06
			Carbon tetrachloride	1	ug/L	11	.	.	.	
			Chlorobenzilate	10	ug/L	4	.	.	.	
			Chloroform	0.5	ug/L	11	.	.	.	
			Chromium (Filtered)	20	ug/L	4	3	6.1	16	20M06
			Chromium (Unfiltered)	20	ug/L	4	3	5.6	14	20M06
			Chrysene	10	ug/L	4	.	.	.	
			Cobalt (Filtered)	20	ug/L	4	2	5.2	5.2	20M06
			Cobalt (Unfiltered)	20	ug/L	4	2	5.1	7.3	20M06
			Copper (Filtered)	20	ug/L	4	2	2.9	4.6	20M06
			Copper (Unfiltered)	20	ug/L	4	2	15	20	20M06
			Di-n-butylphthalate	10	ug/L	4	.	.	.	
			Di-n-octylphthalate	10	ug/L	4	.	.	.	
			Diallate	10	ug/L	4	.	.	.	
			Dibenz[a,h]anthracene	10	ug/L	4	.	.	.	
			Dibenzofuran	10	ug/L	4	.	.	.	
			Diethylphthalate	10	ug/L	4	.	.	.	
			Dimethoate	10	ug/L	4	.	.	.	
			Dimethyl phthalate	10	ug/L	4	.	.	.	
			Diphenylamine	10	ug/L	4	.	.	.	
			Ethyl methanesulfonate	10	ug/L	4	.	.	.	
			Ethylbenzene	2	ug/L	11	9	0.049	120	20M06
			Famphur	10	ug/L	4	.	.	.	
			Fluoranthene	10	ug/L	4	.	.	.	
			Fluorene	10	ug/L	4	.	.	.	
			Hexachlorobenzene	10	ug/L	4	.	.	.	
			Hexachlorobutadiene	10	ug/L	4	.	.	.	
			Hexachlorocyclopentadiene	10	ug/L	4	.	.	.	
			Hexachloroethane	10	ug/L	4	.	.	.	
			Hexachlorophene	10	ug/L	4	.	.	.	
			Hexachloropropene	10	ug/L	4	.	.	.	
			Indeno(1,2,3-cd)pyrene	10	ug/L	4	.	.	.	
			Iron (Filtered)	20	ug/L	4	4	40	3900	20M06

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-8	Water	1993	Iron (Unfiltered)	20	ug/L	4	4	540	5300	20M06
			Isodrin	10	ug/L	4	.	.	.	
			Isophorone	10	ug/L	4	.	.	.	
			Isosafrole	10	ug/L	4	.	.	.	
			Kepone	10	ug/L	4	.	.	.	
			Kerosene	10000	ug/L	4	1	7.3	7.3	20M06
			Lead (Filtered)	5	ug/L	4	2	2	3	20M15
			Lead (Unfiltered)	5	ug/L	3	3	2	8.6	20M14
			Magnesium (Filtered)	100	ug/L	4	4	9100	11000	20M06
			Magnesium (Unfiltered)	100	ug/L	4	4	9800	12000	20M06
			Manganese (Filtered)	10	ug/L	4	4	6.5	2300	20M06
			Manganese (Unfiltered)	10	ug/L	4	4	20	3700	20M15
			Mercury (Filtered)	0.2	ug/L	4	.	.	.	
			Mercury (Unfiltered)	0.2	ug/L	4	.	.	.	
			Methapyrilene	10	ug/L	4	.	.	.	
			Methyl methanesulfonate	10	ug/L	4	.	.	.	
			Methylenechloride	5	ug/L	11	7	0.071	0.3	20M06
			N-Nitroso-di-n-dipropylamine	10	ug/L	4	.	.	.	
			N-Nitrosodi-n-butylamine	10	ug/L	4	.	.	.	
			N-Nitrosodiethylamine	10	ug/L	4	.	.	.	
			N-Nitrosodimethylamine	10	ug/L	4	.	.	.	
			N-Nitrosodiphenylamine	10	ug/L	4	.	.	.	
			N-Nitrosomethylethylamine	10	ug/L	4	.	.	.	
			N-Nitrosomorpholine	10	ug/L	4	.	.	.	
			N-Nitrosopiperidine	10	ug/L	4	.	.	.	
			Naphthalene	10	ug/L	4	.	.	.	
			Nickel (Filtered)	30	ug/L	4	.	.	.	
			Nickel (Unfiltered)	30	ug/L	4	.	.	.	
			Nitrobenzene	10	ug/L	4	.	.	.	
			Nitrosopyrrolidine	10	ug/L	4	.	.	.	
			Parathion	10	ug/L	4	.	.	.	
			Pentachlorobenzene	10	ug/L	4	.	.	.	
			Pentachloronitrobenzene (PCNB)	10	ug/L	4	.	.	.	
			Pentachlorophenol	50	ug/L	4	.	.	.	
			Phenacetin	10	ug/L	4	.	.	.	
			Phenanthrene	10	ug/L	4	.	.	.	
			Phenol	10	ug/L	4	2	6.6	13	20M06
			Potassium (Filtered)	300	ug/L	4	4	2000	3000	20M06
			Potassium (Unfiltered)	300	ug/L	4	4	2000	3000	20M06
			Pronamide	10	ug/L	4	.	.	.	
			Pyrene	10	ug/L	4	.	.	.	
			Pyridine	10	ug/L	4	.	.	.	
			Safrol	10	ug/L	4	.	.	.	
			Silver (Filtered)	20	ug/L	4	1	3.4	3.4	20M06
			Silver (Unfiltered)	20	ug/L	4	1	4	4	20M06
			Sodium (Filtered)	300	ug/L	4	4	3000	3900	20M15
			Sodium (Unfiltered)	300	ug/L	4	4	3100	4500	20M15
			Tetrachloroethene	0.5	ug/L	11	.	.	.	
			Tetraethyl dithiopyrophosphate	10	ug/L	4	.	.	.	
			Tin (Filtered)	100	ug/L	4	.	.	.	
			Tin (Unfiltered)	100	ug/L	4	.	.	.	
			Toluene	2	ug/L	11	10	0.13	230	20M06
			Tributyl phosphate	10	ug/L	4	.	.	.	
			Trichloroethene	1	ug/L	11	.	.	.	
			Tris-2-chloroethyl phosphate	10	ug/L	4	.	.	.	

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-8	Water	1993	Vanadium (Filtered)	30	ug/L	4	.	.	.	
			Vanadium (Unfiltered)	30	ug/L	4	2	4.2	5	20M15
			Vinyl chloride	2	ug/L	11	11	2	2	20M06
			Xylenes (total)	5	ug/L	11	10	0.25	370	20M06
			Zinc (Filtered)	10	ug/L	4	1	4.1	4.1	20M15
			Zinc (Unfiltered)	10	ug/L	4	4	4.8	20	20M06
			alpha,alpha-Dimethylphenethylamine	10	ug/L	4	.	.	.	
			cis-1,2-Dichloroethylene	1	ug/L	11	.	.	.	
			m-Cresol	10	ug/L	4	2	3.8	11	20M06
			m-Dinitrobenzene	10	ug/L	4	.	.	.	
			o-Toluidine	10	ug/L	4	.	.	.	
			p-Dimethylaminoazobenzene	10	ug/L	4	.	.	.	
			p-Phenylenediamine	10	ug/L	4	.	.	.	
			sym-Trinitrobenzene	10	ug/L	4	.	.	.	
			trans-1,2-Dichloroethylene	1	ug/L	11	.	.	.	

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-9	Soil	1986	1,1,2,2-Tetrachloroethane	5	ug/kg	6	.	.	.	
			1,1-Dichloroethene	5	ug/kg	6	.	.	.	
			1,2-Dimethylbenzene	5000	ug/kg	6	.	.	.	
			2-Butanone	5	ug/kg	6	.	.	.	
			Benzene	5	ug/kg	6	.	.	.	
			Chlorobenzene	5	ug/kg	6	.	.	.	
			Chloroform	5	ug/kg	6	.	.	.	
			Ethylbenzene	5	ug/kg	6	.	.	.	
			Methylenechloride	5	ug/kg	6	.	.	.	
			Tetrachloroethene	5	ug/kg	6	.	.	.	
			Toluene	5	ug/kg	6	.	.	.	
			Vinyl chloride	5	ug/kg	6	.	.	.	

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-9	Soil	Stage 3	Benzene	44	ug/kg	2	.	.	.	
			Ethylbenzene	80	ug/kg	2	1	8700	8700	20M01
			Methylenechloride	150	ug/kg	2	.	.	.	
			Moisture	.	Percent	2	2	3.1	4	20M01
			TPH	10000	ug/kg	2	2	41000	157000	20M01
			Tetrachloroethene	90	ug/kg	2	1	8500	8500	20M01
			Toluene	160	ug/kg	2	.	.	.	
			Vinyl chloride	290	ug/kg	2	1	13000	13000	20M01
			Xylenes (total)	80	ug/kg	2	1	12100	12100	20M01

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 67

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-9	Soil	Stage 4	1,1,2,2-Tetrachloroethane	170	ug/kg	11	1	670	670	20SB14
			1,1-Dichloroethene	200	ug/kg	11	.	.	.	
			2,4-Dimethylphenol	80	ug/kg	11	.	.	.	
			2-Methylnaphthalene	30	ug/kg	11	2	780	2500	20SB14
			2-Methylphenol	30	ug/kg	11	.	.	.	
			4-Methylphenol	30	ug/kg	11	.	.	.	
			Acenaphthene	30	ug/kg	11	3	40	90	20SB07
			Acenaphthylene	30	ug/kg	11	1	70	70	20SB09
			Anthracene	30	ug/kg	11	4	60	190	20SB09
			Benzene	80	ug/kg	11	.	.	.	
			Benzo(a)anthracene	50	ug/kg	11	4	280	1700	20M24
			Benzo(a)pyrene	70	ug/kg	11	4	260	1500	20M24
			Benzo(b)fluoranthene	70	ug/kg	11	4	240	1300	20M24
			Benzo(ghi)perylene	80	ug/kg	11	4	170	1000	20M24
			Benzo(k)fluoranthene	70	ug/kg	11	4	270	1000	20M24
			Benzoic acid	80	ug/kg	11	.	.	.	
			Benzyl alcohol	80	ug/kg	11	.	.	.	
			Bis(2-ethylhexyl) phthalate	50	ug/kg	11	4	60	310	20SB21
			Chlorobenzene	170	ug/kg	11	.	.	.	
			Chloroform	120	ug/kg	11	.	.	.	
			Chrysene	50	ug/kg	11	4	360	1900	20M24
			Dibenz[a,h]anthracene	80	ug/kg	11	1	100	100	20SB09
			Dibenzofuran	30	ug/kg	11	3	50	210	20M24
			Ethylbenzene	250	ug/kg	11	.	.	.	
			Fluoranthene	30	ug/kg	11	4	910	4800	20M24
			Fluorene	30	ug/kg	11	4	50	340	20M24
			Indeno(1,2,3-cd)pyrene	80	ug/kg	11	4	190	1100	20M24
			Methylenechloride	760	ug/kg	11	.	.	.	
			Moisture	.	Percent	11	11	3.3	19.2	20M22
			Naphthalene	30	ug/kg	11	2	280	840	20SB14
			Phenanthrene	30	ug/kg	11	4	820	3500	20M24
			Phenol	80	ug/kg	11	.	.	.	
			Pyrene	30	ug/kg	11	4	660	1800	20M24
			TPH	10000	ug/kg	47	30	10000	28000000	20SB07
			Tetrachloroethene	130	ug/kg	11	.	.	.	
			Toluene	170	ug/kg	11	1	10000	10000	20SB07
			Trichloromonofluoromethane	80	ug/kg	6	.	.	.	
			Vinyl chloride	80	ug/kg	11	.	.	.	
			Xylenes (total)	770	ug/kg	11	1	59600	59600	20SB07

Summary of Sampling Effort and Results for Each Source Area, Media, Stage

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-9	Soil	1993	0,0,0-Triethyl phosphorothioate	660	ug/kg	19	.	.	.	
			0,0-Diethyl 0-2-pyrazinyl phosphorothio	660	ug/kg	19	.	.	.	
			1,1,1-Trichloroethane	0.5	ug/kg	2	.	.	.	
			1,1,2-Trichloroethane	0.5	ug/kg	2	.	.	.	
			1,1-Dichloroethane	1	ug/kg	2	.	.	.	
			1,2,4,5-Tetrachlorobenzene	660	ug/kg	19	.	.	.	
			1,2,4-Trichlorobenzene	660	ug/kg	19	.	.	.	
			1,2-Dichlorobenzene	660	ug/kg	19	.	.	.	
			1,2-Dichloroethane	0.5	ug/kg	2	.	.	.	
			1,3-Dichlorobenzene	660	ug/kg	19	.	.	.	
			1,4-Dichlorobenzene	2	ug/kg	2	.	.	.	
			1,4-Dichlorobenzene	660	ug/kg	19	.	.	.	
			1,4-Naphthoquinone	660	ug/kg	19	.	.	.	
			1-Naphthylamine	660	ug/kg	19	.	.	.	
			2,3,4,6-Tetrachlorophenol	660	ug/kg	19	.	.	.	
			2,4,5-Trichlorophenol	660	ug/kg	19	.	.	.	
			2,4,6-Trichlorophenol	660	ug/kg	19	.	.	.	
			2,4-Dichlorophenol	660	ug/kg	19	.	.	.	
			2,4-Dimethylphenol	660	ug/kg	19	.	.	.	
			2,4-Dinitrophenol	3300	ug/kg	19	.	.	.	
			2,4-Dinitrotoluene	660	ug/kg	19	.	.	.	
			2,6-Dichlorophenol	660	ug/kg	19	.	.	.	
			2,6-Dinitrotoluene	660	ug/kg	19	.	.	.	
			2-Acetylaminofluorene	660	ug/kg	19	.	.	.	
			2-Chloronaphthalene	660	ug/kg	19	.	.	.	
			2-Chlorophenol	660	ug/kg	19	.	.	.	
			2-Methylnaphthalene	660	ug/kg	19	1	670	670	TAXI WAY
			2-Methylphenol	660	ug/kg	19	.	.	.	
			2-Naphthylamine	660	ug/kg	19	.	.	.	
			2-Nitroaniline	3300	ug/kg	19	.	.	.	
			2-Nitrophenol	660	ug/kg	19	.	.	.	
			2-Picoline	660	ug/kg	19	.	.	.	
			3,3'-Dichlorobenzidine	1300	ug/kg	19	.	.	.	
			3,3'-Dimethylbenzidine	660	ug/kg	19	.	.	.	
			3-Methylcholanthrene	660	ug/kg	19	.	.	.	
			3-Nitroaniline	3300	ug/kg	19	.	.	.	
			4,4'-DDD	20	ug/kg	3	2	5.2	25	COMPOSITE
			4,4'-DDE	10	ug/kg	3	1	9.6	9.6	COMPOSITE
			4,4'-DDT	20	ug/kg	3	1	50	50	COMPOSITE
			4,6-Dinitro-o-cresol	3300	ug/kg	19	.	.	.	
			4-Aminobiphenyl	660	ug/kg	19	.	.	.	
			4-Bromophenylphenyl ether	660	ug/kg	19	.	.	.	
			4-Chloro-3-methylphenol	1300	ug/kg	19	.	.	.	
			4-Chloroaniline	1300	ug/kg	19	.	.	.	
			4-Chlorophenylphenyl ether	660	ug/kg	19	.	.	.	
			4-Methylphenol	660	ug/kg	19	.	.	.	
			4-Nitroaniline	3300	ug/kg	19	.	.	.	
			4-Nitrophenol	3300	ug/kg	19	.	.	.	
			4-Nitroquinoline-1-oxide	660	ug/kg	19	.	.	.	
			5-Nitro-o-toluidine	660	ug/kg	19	.	.	.	
			7,12-Dimethylbenz[a]anthracene	660	ug/kg	19	.	.	.	
			Acenaphthene	660	ug/kg	19	7	170	7500	TAXI WAY
			Acenaphthylene	660	ug/kg	19	2	520	1300	TAXI WAY
			Acetophenone	660	ug/kg	19	.	.	.	
			Aldrin	10	ug/kg	3	.	.	.	
			Alpha-BHC	10	ug/kg	3	.	.	.	
			Aluminum	20000	ug/kg	2	2	9100000	9600000	20MW26
			Aniline	660	ug/kg	19	.	.	.	

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 69

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-9	Soil	1993	Anthracene	660	ug/kg	19	7	420	13000	TAXI WAY
			Antimony	20000	ug/kg	2	1	11000	11000	20MW26
			Aramite	660	ug/kg	19	.	.	.	
			Aroclor-1016	100	ug/kg	3	.	.	.	
			Aroclor-1221	200	ug/kg	3	.	.	.	
			Aroclor-1232	200	ug/kg	3	.	.	.	
			Aroclor-1242	100	ug/kg	3	.	.	.	
			Aroclor-1248	100	ug/kg	3	.	.	.	
			Aroclor-1254	100	ug/kg	3	.	.	.	
			Aroclor-1260	100	ug/kg	3	.	.	.	
			Arsenic	500	ug/kg	2	2	4600	7200	20MW26
			Barium	2000	ug/kg	2	2	76000	100000	20MW26
			Benzene	2	ug/kg	2	.	.	.	
			Benzo(a)anthracene	660	ug/kg	19	9	220	29000	TAXI WAY
			Benzo(a)pyrene	660	ug/kg	19	10	180	31000	TAXI WAY
			Benzo(b)fluoranthene	660	ug/kg	19	9	240	28000	TAXI WAY
			Benzo(ghi)perylene	660	ug/kg	19	8	270	17000	TAXI WAY
			Benzo(k)fluoranthene	660	ug/kg	19	8	500	30000	TAXI WAY
			Benzothiazole	660	ug/kg	19	.	.	.	
			Benzyl alcohol	1300	ug/kg	19	.	.	.	
			Beryllium	300	ug/kg	2	2	170	180	20MW26
			Beta-BHC	10	ug/kg	3	.	.	.	
			Bis(2-Chloroethoxy)methane	660	ug/kg	19	.	.	.	
			Bis(2-Chloroisopropyl) ether	660	ug/kg	19	.	.	.	
			Bis(2-chloroethyl) ether	660	ug/kg	19	.	.	.	
			Bis(2-ethylhexyl) phthalate	660	ug/kg	19	3	75	140	20MW26
			Butylbenzylphthalate	660	ug/kg	19	.	.	.	
			Cadmium	1000	ug/kg	2	1	400	400	20MW26
			Calcium	10000	ug/kg	2	2	4800000	6800000	20MW26
			Carbon tetrachloride	1	ug/kg	2	.	.	.	
			Chlordane	50	ug/kg	3	1	21	21	COMPOSITE
			Chlorobenzilate	660	ug/kg	19	.	.	.	
			Chloroform	0.5	ug/kg	2	.	.	.	
			Chromium	2000	ug/kg	2	2	18000	22000	20MW26
			Chrysene	660	ug/kg	19	9	240	39000	TAXI WAY
			Cobalt	2000	ug/kg	2	2	8000	10000	20MW26
			Copper	2000	ug/kg	2	2	19000	28000	20MW26
			Delta-BHC	20	ug/kg	3	.	.	.	
			Di-n-butylphthalate	660	ug/kg	19	.	.	.	
			Di-n-octylphthalate	660	ug/kg	19	.	.	.	
			Diallate	660	ug/kg	19	.	.	.	
			Dibenz[a,h]anthracene	660	ug/kg	19	.	.	.	
			Dibenzofuran	660	ug/kg	19	7	140	5700	TAXI WAY
			Dieldrin	10	ug/kg	3	.	.	.	
			Diethylphthalate	660	ug/kg	19	2	200	600	TAXI WAY 1
			Dimethoate	660	ug/kg	19	.	.	.	
			Dimethyl phthalate	660	ug/kg	19	.	.	.	
			Diphenylamine	660	ug/kg	19	.	.	.	
			Endosulfan I	10	ug/kg	3	.	.	.	
			Endosulfan II	10	ug/kg	3	.	.	.	
			Endosulfan sulfate	20	ug/kg	3	.	.	.	
			Endrin	10	ug/kg	3	.	.	.	
			Endrin Aldehyde	50	ug/kg	3	.	.	.	
			Ethyl methanesulfonate	660	ug/kg	19	.	.	.	
			Ethylbenzene	2	ug/kg	2	.	.	.	

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-9	Soil	1993	Famphur	660	ug/kg	19	.	.	.	
			Fluoranthene	660	ug/kg	19	12	280	90000	TAXI WAY
			Fluorene	660	ug/kg	19	6	260	9300	TAXI WAY
			Gamma-BHC (Lindane)	10	ug/kg	3	.	.	.	
			Heptachlor	10	ug/kg	3	.	.	.	
			Heptachlor epoxide	60	ug/kg	3	.	.	.	
			Hexachlorobenzene	660	ug/kg	19	.	.	.	
			Hexachlorobutadiene	660	ug/kg	19	.	.	.	
			Hexachlorocyclopentadiene	660	ug/kg	19	.	.	.	
			Hexachloroethane	660	ug/kg	19	.	.	.	
			Hexachlorophene	660	ug/kg	19	.	.	.	
			Hexachloropropene	660	ug/kg	19	.	.	.	
			Indeno(1,2,3-cd)pyrene	660	ug/kg	19	8	280	17000	TAXI WAY
			Iron	2000	ug/kg	2	2	16000000	20000000	20MW26
			Isodrin	660	ug/kg	19	.	.	.	
			Isophorone	660	ug/kg	19	.	.	.	
			Isosafrole	660	ug/kg	19	.	.	.	
			Kepone	660	ug/kg	19	.	.	.	
			Kerosene	660	ug/kg	19	.	.	.	
			Lead	500	ug/kg	2	2	4400	6800	20MW26
			Magnesium	10000	ug/kg	2	2	4600000	5000000	20MW26
			Manganese	1000	ug/kg	2	2	300000	350000	20MW26
			Mercury	400	ug/kg	2	.	.	.	
			Methapyrilene	660	ug/kg	19	.	.	.	
			Methoxychlor	100	ug/kg	3	.	.	.	
			Methyl methanesulfonate	660	ug/kg	19	.	.	.	
			Methylenechloride	5	ug/kg	2	.	.	.	
			N-Nitroso-di-n-dipropylamine	660	ug/kg	19	.	.	.	
			N-Nitrosodi-n-butylamine	660	ug/kg	19	.	.	.	
			N-Nitrosodiethylamine	660	ug/kg	19	.	.	.	
			N-Nitrosodimethylamine	660	ug/kg	19	.	.	.	
			N-Nitrosodiphenylamine	660	ug/kg	19	.	.	.	
			N-Nitrosomethylethylamine	660	ug/kg	19	.	.	.	
			N-Nitrosomorpholine	660	ug/kg	19	.	.	.	
			N-Nitrosopiperidine	660	ug/kg	19	.	.	.	
			Naphthalene	660	ug/kg	19	1	790	790	TAXI WAY
			Nickel	3000	ug/kg	2	2	19000	23000	20MW26
			Nitrobenzene	660	ug/kg	19	.	.	.	
			Nitrosopyrrolidine	660	ug/kg	19	.	.	.	
			Parathion	660	ug/kg	19	.	.	.	
			Pentachlorobenzene	660	ug/kg	19	.	.	.	
			Pentachloronitrobenzene (PCNB)	660	ug/kg	19	.	.	.	
			Pentachlorophenol	3300	ug/kg	19	.	.	.	
			Phenacetin	660	ug/kg	19	.	.	.	
			Phenanthrene	660	ug/kg	19	10	330	81000	TAXI WAY
			Phenol	660	ug/kg	19	.	.	.	
			Potassium	30000	ug/kg	2	2	800000	900000	20MW26
			Pronamide	660	ug/kg	19	.	.	.	
			Pyrene	660	ug/kg	19	12	260	71000	TAXI WAY
			Pyridine	660	ug/kg	19	5	210	39000	TAXI WAY
			Safrol	660	ug/kg	19	.	.	.	
			Silver	2000	ug/kg	2	.	.	.	
			Sodium	30000	ug/kg	2	2	440000	570000	20MW26
			TPH-diesel	5000	ug/kg	1	.	.	.	
			TPH-diesel	5200	ug/kg	1	.	.	.	

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 71

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-9	Soil	1993	TPH-gasoline	8800	ug/kg	1	.	.	.	
			TPH-gasoline	9000	ug/kg	1	.	.	.	
			Tetrachloroethene	0.5	ug/kg	2	.	.	.	
			Tetraethyl dithiopyrophosphate	660	ug/kg	19	.	.	.	
			Tin	10000	ug/kg	2	.	.	.	
			Toluene	2	ug/kg	2	2	0.17	0.33	20MW26
			Toxaphene	400	ug/kg	3	.	.	.	
			Tributyl phosphate	660	ug/kg	19	.	.	.	
			Trichloroethene	1	ug/kg	2	.	.	.	
			Tris-2-chloroethyl phosphate	660	ug/kg	19	.	.	.	
			Vanadium	3000	ug/kg	2	2	36000	39000	20MW26
			Vinyl chloride	2	ug/kg	2	.	.	.	
			Xylenes (total)	5	ug/kg	2	.	.	.	
			Zinc	10	ug/kg	2	2	40000	47000	20MW26
			alpha,alpha-Dimethylphenethylamine	660	ug/kg	19	.	.	.	
			cis-1,2-Dichloroethylene	1	ug/kg	2	2	1	1	20MW26
			m-Cresol	660	ug/kg	19	.	.	.	
			m-Dinitrobenzene	660	ug/kg	19	.	.	.	
			o-Toluidine	660	ug/kg	19	.	.	.	
			p-Dimethylaminoazobenzene	660	ug/kg	19	.	.	.	
			p-Phenylenediamine	660	ug/kg	19	.	.	.	
			sym-Trinitrobenzene	660	ug/kg	19	.	.	.	
			trans-1,2-Dichloroethylene	1	ug/kg	2	.	.	.	

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 72

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-9	Soil Gas	Stage 3	1,3-Dimethylbenzene	10	ug/L	23	17	10	18200	20SV15
			Benzene	10	ug/L	23	7	290	69400	20SV15
			Ethylbenzene	10	ug/L	23	9	10	19800	20SV17
			Toluene	10	ug/L	23	13	10	129000	20SV15
			Total BTEX	10	ug/L	23	18	10	235000	20SV15

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 73

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-9	Water	1986	1,1,2,2-Tetrachloroethane	1	ug/L	2	.	.	.	
			1,1-Dichloroethene	1	ug/L	2	.	.	.	
			2-Butanone	1	ug/L	2	.	.	.	
			Benzene	1	ug/L	2	.	.	.	
			Chlorobenzene	1	ug/L	2	.	.	.	
			Chloroform	1	ug/L	2	.	.	.	
			Ethylbenzene	1	ug/L	2	.	.	.	
			Methylenechloride	1	ug/L	2	.	.	.	
			Oil & Grease	100	ug/L	2	2	100	100	20C-2
			Petroleum Oil & Grease	100	ug/L	2	2	100	100	20C-2
			TOC	.	ug/L	2	2	11000	13000	20C-3
			Tetrachloroethene	1	ug/L	2	.	.	.	
			Toluene	1	ug/L	2	.	.	.	
			Vinyl chloride	1	ug/L	2	.	.	.	
			Xylenes (total)	1	ug/L	2	.	.	.	

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 74

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-9	Water	Stage 3	2,4-Dimethylphenol	0.28	ug/L	3	.	.	.	
			2-Methylnaphthalene	0.9	ug/L	3	1	191	191	20M01
			2-Methylphenol	0.84	ug/L	3	.	.	.	
			4-Methylphenol	0.8	ug/L	3	.	.	.	
			Acenaphthene	0.32	ug/L	2	.	.	.	
			Anthracene	0.52	ug/L	3	1	5.2	5.2	20M01
			BIS (2-Ethylmexylphthalate)	2	ug/L	3	1	56	56	20M01
			Benzene	0.15	ug/L	3	3	0.47	120	20M01
			Benzoic acid	.	ug/L	3	.	.	.	
			Benzyl alcohol	0.07	ug/L	3	.	.	.	
			Chloride	200	ug/L	3	.	.	.	
			Chlorobenzene	0.34	ug/L	3	1	48.1	48.1	20M01
			Dibenzofuran	0.34	ug/L	3	1	2.56	2.56	20M01
			Ethylbenzene	0.46	ug/L	3	1	380	380	20M01
			Fluoranthene	1	ug/L	3	1	20	20	20M01
			Fluorene	0.88	ug/L	3	1	6.4	6.4	20M01
			Naphthalene	0.26	ug/L	3	1	140	140	20M01
			Nitrite/Nitrate	10	ug/L	3	3	12	16	20M08
			Phenanthrene	0.46	ug/L	3	1	22	22	20M01
			Phenol	1	ug/L	3	.	.	.	
			Pyrene	1	ug/L	3	1	15	15	20M01
			Residue, DISS	1000	ug/L	3	3	204000	322000	20M08
			Sulfate	500	ug/L	3	.	.	.	
			TPH	100	ug/L	3	1	13100	13100	20M01
			Toluene	0.25	ug/L	3	3	0.28	2010	20M01
			Xylenes (total)	0.85	ug/L	3	2	2.33	2200	20M01

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

09:04 Saturday, January 29, 1994 75

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-9	Water	Stage 4	1,2-Dimethylbenzene	1	ug/L	27	12	1	1400	20FW42
			1,3-Dimethylbenzene	1	ug/L	27	14	1	4700	20FW39
			2,4-Dimethylphenol	2	ug/L	8	.	.	.	
			2-Methylnaphthalene	1	ug/L	8	2	42	260	20M07
			2-Methylphenol	2	ug/L	8	.	.	.	
			4-Methylphenol	2	ug/L	8	.	.	.	
			Acenaphthene	1	ug/L	8	.	.	.	
			Acenaphthylene	1	ug/L	8	.	.	.	
			Anthracene	1	ug/L	8	1	1.7	1.7	20M01
			Benzene	1	ug/L	35	15	2	25000	20FW42
			Benzo(a)anthracene	1	ug/L	7	.	.	.	
			Benzo(a)pyrene	2	ug/L	8	.	.	.	
			Benzo(b)fluoranthene	1.5	ug/L	8	.	.	.	
			Benzo(ghi)perylene	2.5	ug/L	8	.	.	.	
			Benzo(k)fluoranthene	1.5	ug/L	8	.	.	.	
			Benzoic acid	25	ug/L	8	.	.	.	
			Benzyl alcohol	2	ug/L	8	.	.	.	
			Bis(2-ethylhexyl) phthalate	2	ug/L	8	3	7.1	21	20M22
			Chlorobenzene	0.4	ug/L	8	.	.	.	
			Chrysene	1	ug/L	8	.	.	.	
			Dibenz[a,h]anthracene	2.5	ug/L	8	.	.	.	
			Dibenzofuran	1	ug/L	8	.	.	.	
			Ethylbenzene	1	ug/L	35	12	1.21	1600	20FW46
			Fluoranthene	1	ug/L	8	1	6.3	6.3	20M01
			Fluorene	1	ug/L	8	.	.	.	
			Indeno(1,2,3-cd)pyrene	2.5	ug/L	8	.	.	.	
			Naphthalene	1	ug/L	8	2	12	160	20M07
			Phenanthrene	1	ug/L	8	1	6.6	6.6	20M01
			Phenol	2	ug/L	8	.	.	.	
			Pyrene	1	ug/L	8	1	5.5	5.5	20M01
			TPH	200	ug/L	8	1	6300	6300	20M01
			Toluene	1	ug/L	35	18	0.56	21000	20FW42
			Xylenes (total)	0.4	ug/L	8	4	3.44	1590	20M07

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-9	Water	1993	0,0,0-Triethyl phosphorothioate	10	ug/L	7	.	.	.	
			0,0-Diethyl 0-2-pyrazinyl phosphorothio	10	ug/L	7	.	.	.	
			1,1,1-Trichloroethane	0.5	ug/L	20	.	.	.	
			1,1,2-Trichloroethane	0.5	ug/L	20	.	.	.	
			1,1-Dichloroethane	1	ug/L	20	.	.	.	
			1,2,4,5-Tetrachlorobenzene	10	ug/L	7	.	.	.	
			1,2,4-Trichlorobenzene	10	ug/L	7	.	.	.	
			1,2-Dichlorobenzene	10	ug/L	7	.	.	.	
			1,2-Dichloroethane	0.5	ug/L	20	.	.	.	
			1,3-Dichlorobenzene	10	ug/L	7	.	.	.	
			1,4-Dichlorobenzene	2	ug/L	20	.	.	.	
			1,4-Dichlorobenzene	10	ug/L	7	.	.	.	
			1,4-Naphthoquinone	10	ug/L	7	.	.	.	
			1-Naphthylamine	10	ug/L	7	.	.	.	
			2,3,4,6-Tetrachlorophenol	10	ug/L	7	.	.	.	
			2,4,5-Trichlorophenol	10	ug/L	7	.	.	.	
			2,4,6-Trichlorophenol	10	ug/L	7	.	.	.	
			2,4-Dichlorophenol	10	ug/L	7	.	.	.	
			2,4-Dimethylphenol	10	ug/L	7	.	.	.	
			2,4-Dinitrophenol	50	ug/L	7	.	.	.	
			2,4-Dinitrotoluene	10	ug/L	7	.	.	.	
			2,6-Dichlorophenol	10	ug/L	7	.	.	.	
			2,6-Dinitrotoluene	10	ug/L	7	.	.	.	
			2-Acetylaminofluorene	10	ug/L	7	.	.	.	
			2-Chloronaphthalene	10	ug/L	7	.	.	.	
			2-Chlorophenol	10	ug/L	7	.	.	.	
			2-Methylnaphthalene	10	ug/L	7	1	58	58	20M07
			2-Methylphenol	10	ug/L	7	.	.	.	
			2-Naphthylamine	10	ug/L	7	.	.	.	
			2-Nitroaniline	50	ug/L	7	.	.	.	
			2-Nitrophenol	10	ug/L	7	.	.	.	
			2-Picoline	10	ug/L	7	.	.	.	
			3,3'-Dichlorobenzidine	20	ug/L	7	.	.	.	
			3,3'-Dimethylbenzidine	10	ug/L	7	.	.	.	
			3-Methylcholanthrene	10	ug/L	7	.	.	.	
			3-Nitroaniline	50	ug/L	7	.	.	.	
			4,6-Dinitro-o-cresol	50	ug/L	7	.	.	.	
			4-Aminobiphenyl	10	ug/L	7	.	.	.	
			4-Bromophenylphenyl ether	10	ug/L	7	.	.	.	
			4-Chloro-3-methylphenol	20	ug/L	7	.	.	.	
			4-Chloroaniline	20	ug/L	7	.	.	.	
			4-Chlorophenylphenyl ether	10	ug/L	7	.	.	.	
			4-Methylphenol	10	ug/L	7	.	.	.	
			4-Nitroaniline	50	ug/L	7	.	.	.	
			4-Nitrophenol	50	ug/L	7	.	.	.	
			4-Nitroquinoline-1-oxide	10	ug/L	7	.	.	.	
			5-Nitro-o-toluidine	10	ug/L	7	.	.	.	
			7,12-Dimethylbenz[a]anthracene	10	ug/L	7	.	.	.	
			Acenaphthene	10	ug/L	7	.	.	.	
			Acenaphthylene	10	ug/L	7	.	.	.	
			Acetophenone	10	ug/L	7	.	.	.	
			Aluminum (Filtered)	200	ug/L	8	2	43	150	20M07
			Aluminum (Unfiltered)	200	ug/L	8	4	73	700	20M08
			Aniline	10	ug/L	7	.	.	.	
			Anthracene	10	ug/L	7	.	.	.	
			Antimony (Filtered)	200	ug/L	8	6	77	150	20M23
			Antimony (Unfiltered)	200	ug/L	8	5	92	130	20M08
			Aramite	10	ug/L	7	.	.	.	

Eielson Air Force Base, Alaska
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-9	Water	1993	Arsenic (Filtered)	5	ug/L	8	6	6.9	13	20M07
			Arsenic (Unfiltered)	5	ug/L	8	7	7.1	33	20M08
			Barium (Filtered)	20	ug/L	8	7	110	260	20M07
			Barium (Unfiltered)	20	ug/L	8	8	0.52	270	20M08
			Benzene	2	ug/L	20	11	0.21	660	20M07
			Benzo(a)anthracene	10	ug/L	7	.	.	.	
			Benzo(a)pyrene	10	ug/L	7	.	.	.	
			Benzo(b)fluoranthene	10	ug/L	7	.	.	.	
			Benzo(ghi)perylene	10	ug/L	7	.	.	.	
			Benzo(k)fluoranthene	10	ug/L	7	.	.	.	
			Benzothiazole	10	ug/L	7	.	.	.	
			Benzyl alcohol	20	ug/L	7	.	.	.	
			Beryllium (Filtered)	3	ug/L	8	2	2	2.1	20M21
			Beryllium (Unfiltered)	3	ug/L	8	2	0.86	0.91	20M21
			Bis(2-Chloroethoxy)methane	10	ug/L	7	.	.	.	
			Bis(2-Chloroisopropyl) ether	10	ug/L	7	.	.	.	
			Bis(2-chloroethyl) ether	10	ug/L	7	.	.	.	
			Bis(2-ethylhexyl) phthalate	10	ug/L	7	3	5.8	160	20M07
			Butylbenzylphthalate	10	ug/L	7	.	.	.	
			Cadmium (Filtered)	10	ug/L	8	1	5	5	20M08
			Cadmium (Unfiltered)	10	ug/L	8	3	6.7	7.2	20M08
			Calcium (Filtered)	100	ug/L	8	8	87	95000	20MW26
			Calcium (Unfiltered)	100	ug/L	8	8	97	98000	20MW26
			Carbon tetrachloride	1	ug/L	20	.	.	.	
			Chlorobenzilate	10	ug/L	7	.	.	.	
			Chloroform	0.5	ug/L	20	.	.	.	
			Chromium (Filtered)	20	ug/L	8	2	10	14	20M07
			Chromium (Unfiltered)	20	ug/L	8	3	6.7	12	20C-2
			Chrysene	10	ug/L	7	.	.	.	
			Cobalt (Filtered)	20	ug/L	8	7	4.1	8.6	20M07
			Cobalt (Unfiltered)	20	ug/L	8	5	4.9	9.9	20MW26
			Copper (Filtered)	20	ug/L	8	1	8.1	8.1	20M07
			Copper (Unfiltered)	20	ug/L	8	.	.	.	
			Di-n-butylphthalate	10	ug/L	7	.	.	.	
			Di-n-octylphthalate	10	ug/L	7	.	.	.	
			Diallate	10	ug/L	7	.	.	.	
			Dibenz[a,h]anthracene	10	ug/L	7	.	.	.	
			Dibenzofuran	10	ug/L	7	.	.	.	
			Diethylphthalate	10	ug/L	7	.	.	.	
			Dimethoate	10	ug/L	7	.	.	.	
			Dimethyl phthalate	10	ug/L	7	.	.	.	
			Diphenylamine	10	ug/L	7	.	.	.	
			Ethyl methanesulfonate	10	ug/L	7	.	.	.	
			Ethylbenzene	2	ug/L	20	12	0.065	170	20M07
			Famphur	10	ug/L	7	.	.	.	
			Fluoranthene	10	ug/L	7	.	.	.	
			Fluorene	10	ug/L	7	.	.	.	
			Hexachlorobenzene	10	ug/L	7	.	.	.	
			Hexachlorobutadiene	10	ug/L	7	.	.	.	
			Hexachlorocyclopentadiene	10	ug/L	7	.	.	.	
			Hexachloroethane	10	ug/L	7	.	.	.	
			Hexachlorophene	10	ug/L	7	.	.	.	
			Hexachloropropene	10	ug/L	7	.	.	.	
			Indeno(1,2,3-cd)pyrene	10	ug/L	7	.	.	.	
			Iron (Filtered)	20	ug/L	8	8	15	18000	20M07

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-9	Water	1993	Iron (Unfiltered)	20	ug/L	8	8	20	18000	20M08
			Isodrin	10	ug/L	7	.	.	.	
			Isophorone	10	ug/L	7	.	.	.	
			Isosafrole	10	ug/L	7	.	.	.	
			Kepone	10	ug/L	7	.	.	.	
			Kerosene	10000	ug/L	7	2	14	170	20M07
			Lead (Filtered)	5	ug/L	8	1	4	4	20M07
			Lead (Unfiltered)	5	ug/L	8	3	1	2	20M08
			Magnesium (Filtered)	100	ug/L	8	8	29	20000	20MW26
			Magnesium (Unfiltered)	100	ug/L	8	7	9600	21000	20MW26
			Manganese (Filtered)	10	ug/L	8	7	870	2800	20M07
			Manganese (Unfiltered)	10	ug/L	8	7	1200	2400	20M07
			Mercury (Filtered)	0.2	ug/L	7	.	.	.	
			Mercury (Unfiltered)	0.2	ug/L	7	.	.	.	
			Methapyrilene	10	ug/L	7	.	.	.	
			Methyl methanesulfonate	10	ug/L	7	.	.	.	
			Methylenechloride	5	ug/L	20	7	0.056	0.18	20M23
			N-Nitroso-di-n-dipropylamine	10	ug/L	7	.	.	.	
			N-Nitrosodi-n-butylamine	10	ug/L	7	.	.	.	
			N-Nitrosodiethylamine	10	ug/L	7	.	.	.	
			N-Nitrosodimethylamine	10	ug/L	7	.	.	.	
			N-Nitrosodiphenylamine	10	ug/L	7	.	.	.	
			N-Nitrosomethylethylamine	10	ug/L	7	.	.	.	
			N-Nitrosomorpholine	10	ug/L	7	.	.	.	
			N-Nitrosopiperidine	10	ug/L	7	.	.	.	
			Naphthalene	10	ug/L	7	1	83	83	20M07
			Nickel (Filtered)	30	ug/L	8	1	23	23	20M07
			Nickel (Unfiltered)	30	ug/L	8	1	24	24	20M21
			Nitrobenzene	10	ug/L	7	.	.	.	
			Nitrosopyrrolidine	10	ug/L	7	.	.	.	
			Parathion	10	ug/L	7	.	.	.	
			Pentachlorobenzene	10	ug/L	7	.	.	.	
			Pentachloronitrobenzene (PCNB)	10	ug/L	7	.	.	.	
			Pentachlorophenol	50	ug/L	7	.	.	.	
			Phenacetin	10	ug/L	7	.	.	.	
			Phenanthrene	10	ug/L	7	.	.	.	
			Phenol	10	ug/L	7	.	.	.	
			Potassium (Filtered)	300	ug/L	8	7	2000	10000	20M07
			Potassium (Unfiltered)	300	ug/L	8	7	2000	10000	20M07
			Pronamide	10	ug/L	7	.	.	.	
			Pyrene	10	ug/L	7	.	.	.	
			Pyridine	10	ug/L	7	.	.	.	
			Safrol	10	ug/L	7	.	.	.	
			Silver (Filtered)	20	ug/L	8	5	2.9	4.9	20M08FT
			Silver (Unfiltered)	20	ug/L	8	3	3.5	6.1	20M08FT
			Sodium (Filtered)	300	ug/L	8	8	84	4300	20M08
			Sodium (Unfiltered)	300	ug/L	8	8	63	4400	20MW26
			Tetrachloroethene	0.5	ug/L	20	.	.	.	
			Tetraethyl dithiopyrophosphate	10	ug/L	7	.	.	.	
			Tin (Filtered)	100	ug/L	8	1	65	65	20M07
			Tin (Unfiltered)	100	ug/L	8	1	53	53	20MW26
			Toluene	2	ug/L	20	16	0.12	300	20M07
			Tributyl phosphate	10	ug/L	7	.	.	.	
			Trichloroethene	1	ug/L	20	.	.	.	
			Tris-2-chloroethyl phosphate	10	ug/L	7	.	.	.	

Eielson Air Force Base, Alaska 09:04 Saturday, January 29, 1994 79
Operable Unit 1
Summary of Sampling Effort and Results for Each Source Area, Media, Stage

Source Area	Media Sampled	Sampling Stage	Analyte	Detection Limit	Units	Samples	Detects	Minimum Detect	Maximum Detect	Maximum Location
E-9	Water	1993	Vanadium (Filtered)	30	ug/L	8	1	4.1	4.1	20M21
			Vanadium (Unfiltered)	30	ug/L	8	2	4	8.5	20M08
			Vinyl chloride	2	ug/L	20	16	2	2	20M07
			Xylenes (total)	5	ug/L	20	16	0.23	530	20M07
			Zinc (Filtered)	10	ug/L	8	5	8.1	40	20M08
			Zinc (Unfiltered)	10	ug/L	8	4	4.5	9.9	20M08FT
			alpha,alpha-Dimethylphenethylamine	10	ug/L	7	.	.	.	
			cis-1,2-Dichloroethylene	1	ug/L	20	.	.	.	
			m-Cresol	10	ug/L	7	.	.	.	
			m-Dinitrobenzene	10	ug/L	7	.	.	.	
			o-Toluidine	10	ug/L	7	.	.	.	
			p-Dimethylaminoazobenzene	10	ug/L	7	.	.	.	
			p-Phenylenediamine	10	ug/L	7	.	.	.	
			sym-Trinitrobenzene	10	ug/L	7	.	.	.	
			trans-1,2-Dichloroethylene	1	ug/L	20	.	.	.	